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An Address

ON

ACHLORHYDRIA:

ITS RELATION TO PERNICIOUS ANÆMIA AND OTHER DISEASES.

Delivered at the Hôpital Saint-Michel, Paris, on Oct. 30th, 1922.

BY ARTHUR F. HURST, M.D. OXF., F.R.C.P. LOND.,
PHYSICIAN TO GUY'S HOSPITAL.

IN my former lecture* I attempted to show how the "hypersthenic gastric diathesis," one manifestation of which is hyperchlorhydria, predisposes to the development of duodenal ulcer. To-day I propose to speak about its direct antithesis—the "achlorhydric gastric diathesis," in which the mucous membrane of the stomach, owing to some obscure congenital deficiency, secretes no hydrochloric acid. Some authors have denied the existence of primary or constitutional achlorhydria, believing that all cases are secondary to chronic gastritis. Though I am convinced that this view is incorrect, the matter is not one of fundamental importance, as the physiological and pathological results of achlorhydria are identical whether the condition is primary or secondary; I shall therefore have to discuss the results of the acquired condition at the same time as that of the congenital abnormality. An understanding of the pathogenesis of achlorhydria is, however, important, as it enables us to decide whether in a given case the condition is likely to be permanent, and what treatment is likely to be most satisfactory. But the effects of achlorhydria on digestion and on the body as a whole are largely independent of its cause, as the same sequels may occur whether it is primary and congenital, secondary to chronic gastritis or other local disease, or a sequel of a gastro-enterostomy or gastrectomy.

ACHLORHYDRIA OR ACHYLIA GASTRICA.

When I speak of achlorhydria I mean a condition in which no free hydrochloric acid is present when fasting and in which none appears throughout the period of digestion. The introduction of the fractional test-meal has greatly increased the accuracy with which this can be recognised. We have found that it is not at all uncommon for free hydrochloric acid to be completely absent from the gastric contents an hour after a meal, and yet to be present in small quantities, and occasionally even in large quantities, at some other period of digestion. Thus out of 325 consecutive fractional test-meals performed at New Lodge Clinic complete achlorhydria was present in 34 (10·5 per cent.) cases; free hydrochloric acid was absent from the one-hour fraction in 30 (9·2 per cent.) additional cases, in 22 of which it was also absent from the resting-juice and from the three-quarter hour fraction, although free acid was present at other times during the test-meal—15 times in normal amount and once actually in excess. In the additional 9·2 per cent. of cases the old-fashioned one-hour test-meal would have led to a diagnosis of achlorhydria, whereas the fractional method showed that free acid was actually present either in subnormal, normal, or even excessive quantity, but that its first appearance was delayed. Thus the frequency of what is diagnosed as achlorhydria is much less than the old method would indicate. This is particularly well seen in the case of cancer of the stomach, in which achlorhydria is found in about 80 per cent. of cases by the old method (Hayem and Lion), but in only about 50 per cent. by the new (Hartman).

The discovery of complete achlorhydria does not necessarily indicate that no gastric juice containing hydrochloric acid is secreted, as small quantities of acid may be completely neutralised by the alkaline saliva and food. Moreover, in most cases of achlorhydria some pepsin is present in the gastric contents. Achlorhydria is therefore not synonymous with achylia gastrica, which is very rare in comparison. Achlorhydria has the same effect on digestion whether it is due to actual achylia or not, and, as it is also more readily recognised, for practical purposes a diagnosis of achlorhydria is sufficient, and the term should be employed in preference to achylia unless actual investigations have proved that no trace of hydrochloric acid or pepsin is secreted by the gastric mucous membrane.

CHRONIC GASTRITIS AS A COMPLICATION OF PRIMARY OR CONSTITUTIONAL ACHYLIA GASTRICA.

Quite apart from its specific activities, the gastric juice softens any hard and dry particles of food which reach the stomach as a result of insufficient mastication, and dilutes such chemical irritants as alcohol which may reach it in a too concentrated form. The achylia gastrica, which is an inborn error of function unconnected with any organic change in the stomach, is thus likely sooner or later to be complicated by chronic gastritis. As it frequently gives rise to no symptoms of any kind, the individual receives no warning that he must be exceptionally careful to chew his food thoroughly, to avoid mechanical and chemical irritants in his diet, and to avoid swallowing very hot or very cold food or drink. By the time that obvious symptoms have developed, and still more so by the time that death occurs from some secondary or independent disease, the gastric mucous membrane shows obvious changes. This, I believe, is the true explanation of the pathological observations of Faber [1] and others, who have found evidence of chronic gastritis and often of atrophy of the mucous membrane after death in most cases of achylia. They interpreted this as indicating that achylia is always secondary to chronic gastritis, although the pathological changes are often slight and patchy, large areas with normal-looking glands being present, so that there can be no question of the achylia being due to actual destruction of all the secreting tubules.

I believe that it is much more common for the gastritis to be secondary to the achylia. When gastritis is primary—as it undoubtedly is in the achlorhydria of alcoholics, which is often associated with cirrhosis of the liver—recovery frequently occurs if the source of irritation is removed. Thus I have several times observed a return to the normal gastric secretion after alcoholic patients have been deprived of all alcohol and kept on a light diet for a few weeks. On the other hand, the majority of cases of achlorhydria, in which no obvious primary source of irritation is present, show no change in their gastric contents, even after prolonged treatment with careful diet and suitable drugs, although all symptoms may have disappeared for a long period. Thus a lady who consulted me in 1913 for nausea was found to have complete achlorhydria. She lost her symptoms on taking hydrochloric acid. In 1920 she consulted me for nervous symptoms; she had had no nausea or other digestive disturbance for seven years, but complete achlorhydria was still present. In her case I feel convinced that the achlorhydria was a congenital abnormality, and any sign of inflammation or atrophy which might be discovered on microscopical examination of her gastric mucous membrane would, I believe, be due to the permanent loss of the protection from mechanical and chemical irritants normally afforded by the softening and diluting action of the gastric juice. Primary achylia gastrica does not depend upon any anatomical peculiarity, as fragments of gastric mucous membrane, which I have had removed during an operation for appendicitis in patients with this condition, have generally looked perfectly normal and have always shown the usual number of healthy-looking oxyntic cells. It must therefore be due to

* THE LANCET, 1922, ii., 1369.

an inborn deficiency in the functional capacity of glands, which appear to be structurally normal.

THE DIGESTIVE FUNCTIONS OF GASTRIC JUICE.

The specific functions of the stomach are two-fold—digestive and antiseptic. The digestive function consists in the chemical and physical preparation of the food which reaches it from the mouth for digestion in the intestines. The antiseptic function consists in partial destruction of organisms originating in the mouth, nose, or naso-pharynx, or introduced in food or drink.

The chief digestive function is the partial conversion of proteins into simple bodies by the action of pepsin, which is only active in the presence of free or organically combined hydrochloric acid. The other ferments of the gastric juice are of comparatively little use, but the softening action of the hydrochloric acid on connective tissue, which was first emphasised by Adolf Schmidt, is an important function, as it disintegrates meat and permits the gastric and pancreatic juice to act upon the protein and fat. As the secretin formed by the action of hydrochloric acid on the prosecretin present in the duodenal mucous membrane was shown by Bayliss and Starling to be an important stimulant of pancreatic secretion, it might be expected that achylia gastrica would lead to achylia pancreatica. This is not, however, the case, though curiously enough severe pancreatic disease, in which little or no pancreatic juice is secreted, is almost always associated with achlorhydria. Presumably the psychical and the other chemical stimuli of pancreatic secretion are sufficiently powerful to cause an adequate flow of juice in the majority of cases.

In the absence of the normal gastric secretion food enters the duodenum in much the same state as that in which it is swallowed. If the individual eats slowly and chews thoroughly, any mechanical and thermal irritation the food might exert will be lost in the mouth, and any chemical irritants it contains will be diluted by the saliva, so that it is not likely to damage seriously either the gastric or intestinal mucous membrane. But if it is bolted, or if mastication is inefficient owing to want of teeth, the food will have the same deleterious effects on the duodenal mucous membrane which I have already mentioned in connexion with the stomach, though the rest of the intestine will be protected by the diluting action of the bile and the pancreatic and intestinal juices. The saliva cannot, however, in any way compensate for the loss of the softening effect of the hydrochloric acid on connective tissue and the digestive action of pepsin on proteins. Consequently in all cases of achlorhydria much completely undigested food will reach the duodenum. Although pancreatic digestion is in most cases sufficient to do the work of the gastric juice in addition to its own, protein digestion in the intestine will be considerably delayed, and a larger quantity than normal is likely to reach the cæcum in an incompletely digested state, so that there will be a plentiful supply of only slightly altered protein available for bacterial decomposition in the colon. Achlorhydria is frequently latent, being discovered accidentally in people with no obvious digestive symptoms. When symptoms occur, they are due chiefly to the irritation of the small intestines by food inadequately prepared in the stomach. To this is often added irritation of the colon by products of abnormal bacterial activity owing to the supply of incompletely digested proteins being excessive, and to the excessive number of bacteria likely to reach it because of the absence of the normal antiseptic action of the gastric juice.

INTESTINAL DYSPEPSIA FOLLOWING GASTRO-ENTEROSTOMY.

The digestive symptoms which may follow a gastro-enterostomy, apart from the development of a gastro-jejunal or jejunal ulcer, are of a precisely similar nature to those caused by primary achylia gastrica, being due to the passage into the jejunum of food which has not undergone the necessary mechanical and chemical preparation in the stomach owing to its rapid evacuation, and to the absence of free hydrochloric acid, which frequently follows the operation unless it is performed for a duodenal ulcer, when the hyperchlorhydria generally persists (Conybeare).[2]

ASSOCIATION OF ACHLORHYDRIA WITH APPENDICITIS AND CHOLECYSTITIS.

The majority of people with pyorrhœa alveolaris are none the worse for the large quantity of infective pus they are constantly swallowing, as the bacteria are to a large extent destroyed by the antiseptic action of the hydrochloric acid of the gastric juice. But out of each hundred normal people about four have constitutional achylia gastrica (Bennett and Ryle[3]), and presumably the same proportion of otherwise healthy individuals with pyorrhœa alveolaris, or chronic infection of the tonsils, nose, or naso-pharynx, have achylia. So long as the mucous membrane of the stomach and intestines is intact and no abnormal degree of stasis occurs in any part of the alimentary canal, the bacteria, which gain access to the stomach and, owing to the loss of the antiseptic action of the gastric juice, pass in undiminished numbers into the intestines, do not invade the mucous membrane. But the excess of streptococci constantly present in all parts of the alimentary canal may seriously aggravate any pathological condition already present. It has, for example, been shown by Rosenow that appendicitis and cholecystitis are probably always secondary to hæmatogenous infection, and that the same streptococci isolated from the teeth or tonsils of a case of appendicitis or cholecystitis, which give rise to inflammation of the appendix or gall-bladder when injected into the veins of animals, have no such effect when introduced in large quantities into the lumen of the appendix or gall-bladder respectively. When, however, the mucous membrane of the appendix is once damaged or the free flow of its contents is impeded by the presence of fæcolith or as the result of a stricture or kink following a previous attack of appendicitis, secondary infection from the lumen may occur and give rise either to an attack of acute appendicitis or to chronic appendicitis. The same thing may happen in connexion with the gall-bladder after its mucous membrane has once become damaged. I have long been struck by the comparative frequency of achlorhydria in patients suffering from chronic appendicitis, and T. G. D. Bonar[4] has recently found that 33 per cent. of 65 cases operated upon for this condition at Guy's Hospital had very little or no free hydrochloric acid in their stomach throughout the course of a fractional test-meal. I believe that the hyperchlorhydria which was present in 55 per cent. of Bonar's cases must be a reflex result of the appendicitis, but I cannot see how the achlorhydria can also be secondary. It seems more probable that primary achylia gastrica predisposes to chronic appendicitis by helping to maintain or to aggravate an infection which is primarily hæmatogenous, by permitting the access into the lumen of the appendix of excess of oral streptococci, which in a normal individual would have been destroyed to a large extent by the gastric juice. The proportion of patients with gall-stones who have achlorhydria (49 per cent.) and hyperchlorhydria (23 per cent.) was also found by Bonar to be greater than normal, and I believe that this is due, as in the case of appendicitis, to the former predisposing to ascending infection, whilst the latter is a reflex result of the primary gall-bladder disease.

ACHLORHYDRIA AND RHEUMATOID ARTHRITIS.

Rheumatoid arthritis is, I believe, invariably secondary to focal infection. In most cases this is primarily in the teeth, the removal of which will lead to the rapid cure of most early cases of the disease. Not infrequently the tonsils are also infected and require removal, and occasionally other foci, such as the nasal sinuses, require treatment. But in some severe cases, though temporary improvement follows

the removal of these foci, the disease is not completely arrested. It is then usual to find that the intestines are also infected, presumably from swallowed organisms, the intestinal infection being secondary to that in the mouth. A remarkable proportion of these cases have complete achlorhydria. Thus Faber[1] found achylia gastrica in 15 out of 65 cases of chronic polyarthritis. About four out of every hundred patients who develop rheumatoid arthritis presumably have congenital achylia gastrica. They are extremely likely to develop intestinal infection secondary to their oral sepsis; the treatment of the latter will therefore not lead to their cure. If, for example, ten out of the hundred patients referred to do not recover after the oral sepsis has been eradicated, four of them—or 40 per cent.—are likely to have achlorhydria. The latter is, of course, not an essential predisposing factor in the development of secondary intestinal infection, but it is certainly a very powerful predisposing cause. A test-meal should therefore be given in all cases of rheumatoid arthritis, and, if achlorhydria is found, full doses of hydrochloric acid should be given, as well as sour milk, and perhaps a vaccine prepared from streptococci isolated from infected teeth and the intestinal contents.

ACHLORHYDRIA AND ADDISON'S (PERNICIOUS) ANÆMIA.

It has long been known that Addison's (pernicious) anæmia is almost invariably associated with complete absence of free hydrochloric acid from the gastric contents when examined after an ordinary test-meal. Recent investigations have shown that this absence of free hydrochloric acid invariably persists throughout the whole period of digestion when investigated by the fractional method. I have already pointed out that it is not at all uncommon to find a small quantity of free acid and occasionally even a larger quantity in one or more of the fractions when the resting juice and the contents removed at the end of three quarters of an hour or an hour or both contain none, but this is never the case in Addison's anæmia.

It has been suggested that the achlorhydria is secondary to the anæmia. But there is abundant evidence that the achlorhydria precedes the development of the anæmia. As Robert Hutchison[5] first pointed out, there is generally a more or less long history of digestive disturbance, of the type which may result from uncomplicated achlorhydria, preceding the first symptoms of anæmia. In one case achlorhydria has actually been discovered 12, in two others 10, and in others 8, 7, 6, 5, 3 (two cases), and 1 year (twice) before the onset of anæmia. If achlorhydria were secondary to the anæmia or even if it were secondary to gastritis produced by the same toxin as that which caused the anæmia, cases would occur in which normal gastric secretion could be observed giving place to hyperchlorhydria and finally to complete achlorhydria as the disease progressed. Such a sequence of events has often been demonstrated in cancer of the stomach and also in phthisis. But at whatever stage in the development of the anæmia the examination is made, achlorhydria is found. It was present, for example, in cases in which the hæmoglobin percentage had not fallen below 85, 85, 80, and 68. The achlorhydria persists when the anæmia has almost or completely disappeared, either spontaneously or as a result of treatment. Thus in three Guy's Hospital cases it was still present when the hæmoglobin percentage was 85, 82, and 80 respectively, compared with 45, 38, and 23 respectively some months or years before (Campbell and Conybeare).[7] Lévine and Ladd[8] found it with the hæmoglobin 82, 104, 85, 87, 88, 85, and 90, although at one time it had been 35, 35, 28, 35, 28, 22, and 48 respectively. Still more remarkable is the case of a man who 17 years ago was in the London Hospital for typical Addison's anæmia with 700,000 red cells per cub. mm. and complete achlorhydria. The achlorhydria was still present, though for years he had been perfectly well and his red corpuscles numbered 5,200,000 per cub. mm., when he was shown at the Medical Society in November, 1922, by Maitland Jones.[9] In a case of Zadek's[10] achlorhydria was present with a hæmoglobin percentage of 108 and red corpuscles numbering 5,400,000 per cub. mm., though at his worst, four years before, the figures had been 23 and 610,000 respectively.

The achlorhydria is thus far more constant than any other symptom, not excluding anæmia. Even the anisocytosis and increase in the average size of the red corpuscles, which Price Jones[6] has shown are never absent in the active stages of the disease, sometimes disappears completely during remissions and after apparent recovery, though the achlorhydria persists. There is no constant change in the gastric secretion in any other form of anæmia. Thus fractional test-meals in my last four patients with gastric or duodenal ulcer, complicated by severe secondary anæmia due to hæmorrhage, gave curves of exactly the same form as would have been expected in the absence of hæmorrhage; the percentage of hæmoglobin in these cases was 30, 33, 48, and 49, which is quite as low as one would expect to find in an average series of cases of Addison's anæmia when first examined. In two cases recorded by Campbell and Conybeare[7] of secondary anæmia caused by rectal hæmorrhage with a hæmoglobin percentage of 44 and 42 respectively, and in two cases of chlorosis with a percentage of 25 and 48, the curves of gastric secretion were normal. Campbell and Conybeare also report a fatal case of Hodgkin's disease, in which the hæmoglobin percentage was 25 and 17 on two occasions three months and three weeks respectively before death; a test-meal given the same day as the first count and again a week after the second showed that free hydrochloric acid was present, though in small quantities. It is obvious, therefore, that anæmia does not cause achlorhydria.

The achlorhydria is not of a specific type, but whatever its origin may be, it predisposes to the development of Addison's anæmia. The history in most cases points to the achlorhydria being of primary or constitutional form, which Bennett and Ryle have shown exists in about 4 per cent. of normal young men, and which Albu and Jung found may occur in two or more members of the same family. This is undoubtedly the inherited factor in the cases of familial Addison's anæmia, which have been recorded with increasing frequency in the last few years. Mustelin,[11] for example, had under his care a woman of 69, her daughter of 44, and the latter's daughter of 25, all of whom had Addison's anæmia and achylia gastrica. Still more important are the cases in which various members of the family of a patient with Addison's anæmia are found to have achlorhydria, though apparently in perfect health. Martius having found achlorhydria in the three children of a patient with achlorhydria, who died of Addison's anæmia, his assistant, Weinberg,[12] examined the gastric contents of 22 children and two sisters of 12 patients with Addison's anæmia and achylia gastrica in Martius's clinic at Rostock. Nine of the children and one sister of seven of the 12 patients had achlorhydria. The most striking history was that of a man with Addison's anæmia, who had four children; of these a boy of 10, a boy of 6, and a girl of 4 had achlorhydria. At this early age it is obvious that the abnormality must have been constitutional and congenital and not acquired. Quite recently Schauman[13] described a family, in which a woman, her mother and sister and the latter's daughter suffered from Addison's anæmia, and another sister had achylia gastrica but no anæmia.

In one of my cases the achlorhydria was due to alcoholic gastritis, in another Guy's Hospital case it resulted from a gastro-enterostomy for ulcer, and—what proves conclusively that it is primary and not secondary—I know of at least five cases in which Addison's anæmia followed the artificial achylia produced by total gastrectomy performed for cancer. There is thus no constant pathological change, such as atrophy, in the gastric mucous membrane after death; in one case of Addison's anæmia, in which a

fragment was excised during an operation for appendicitis, R. D. Passey found no atrophy and no more inflammation than in a specimen obtained under similar circumstances in a case of achlorhydria without anæmia.

SUBACUTE COMBINED DEGENERATION OF THE SPINAL CORD AND ADDISON'S (PERNICIOUS) ANÆMIA.

If patients with Addison's anæmia are carefully examined, about 80 per cent. show definite signs of spinal cord disease. The symptoms, physical signs, and pathological changes are identical with those of subacute combined degeneration of the spinal cord, in which the nervous symptoms are primary, but anæmia develops sooner or later in almost every case. There has been much discussion as to the nature of this anæmia, but I believe that if the blood is repeatedly examined with sufficient care, it will always prove to be of the so-called pernicious form. Digestive symptoms are as common when the nervous symptoms precede the anæmia as when the reverse is the case, and they are frequently the first symptoms to be noticed by the patient. J. R. Bell of Melbourne and I[14] have had the opportunity of investigating ten cases of typical subacute combined degeneration of the cord by the fractional method of gastric analysis. In all ten free hydrochloric acid was completely absent throughout the period of digestion. I know of one additional case in which achlorhydria was discovered in a patient with digestive symptoms a year before the first signs of subacute combined degeneration of the cord appeared. For purposes of control, gastric analyses were made by J. R. Bell in a series of typical cases of disseminated sclerosis and tabes dorsalis. In eight consecutive cases of disseminated sclerosis achlorhydria was never found, the curves of acidity being the same as would be likely to occur in a series of eight normal people. Of nine consecutive cases of tabes dorsalis one was found to have achlorhydria; the remainder had curves which fell within normal limits.

Gastric analysis may, therefore, give information of real help in diagnosis, the presence of free hydrochloric acid in any fraction of a test-meal being a decisive point against the diagnosis of subacute combined degeneration, whereas the discovery of achlorhydria would considerably strengthen the probability of such a diagnosis being correct. In three recent cases, which presented features very suggestive of subacute combined degeneration, a normal curve of gastric acidity was discovered. Each eventually proved to be a case of syphilitic disease of the spinal cord. These cases are analogous with two others, the only cases in Guy's Hospital in which a diagnosis of "pernicious" anæmia had been made, in spite of the fact that free hydrochloric acid was present in the stomach. At the post-mortem no evidence of hæmolysis was present, one being found to have infective endocarditis, and the other, who died of pneumonia, had microscopical changes in the spleen which were typical of Hodgkin's disease.

THE EVIDENCE OF INTESTINAL INFECTION IN ADDISON'S (PERNICIOUS) ANÆMIA AND SUBACUTE COMBINED DEGENERATION OF THE CORD.

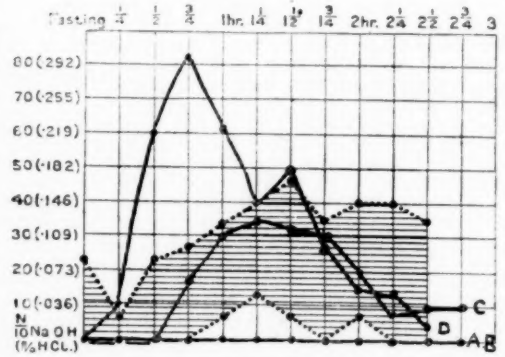
The importance of oral sepsis in Addison's anæmia has been universally acknowledged since Hunter first drew attention to the subject over 20 years ago. Streptococci are almost invariably present in the sockets of septic teeth, whether the individual is otherwise healthy or not, but so far as our observations go the *Streptococcus longus* is not often found in the contents of the duodenum removed during life with a Ryle tube, except in Addison's anæmia and in subacute combined degeneration of the cord. In four normal individuals and in 37 patients suffering from various medical conditions the duodenal contents contained the *S. longus* in only four instances. In six of the 37 cases achlorhydria was present, together with very severe oral sepsis in two and slight pyorrhœa in a third, but in spite of this no streptococci were found. In every one of the nine cases of Addison's anæmia and the four cases of subacute combined degeneration of the cord which we have investigated *S. longus* was obtained on cultivation of the duodenal contents.

In spite of the somewhat small number of cases, the contrast between the 9·8 per cent. of controls, in which streptococci were found, with 100 per cent. of Addison's anæmia and subacute combined degeneration of the cord, is so striking that the conclusion can probably be drawn that an infection of the intestine with *S. longus* is an essential factor in the production of these diseases. In any case the presence of *S. longus* in the duodenum is evidence of active infection of the intestine. In achlorhydria proteins pass into the duodenum in an unaltered form, and bacteria from the mouth and nasopharynx are likely to reach the intestine in far greater numbers than under normal conditions. If achlorhydria is associated with oral sepsis, secondary infection of the intestines is extremely likely to occur. Consequently in Addison's anæmia and in subacute combined degeneration of the cord intestinal infection is likely to be associated with the presence in the intestines of excess of undigested or incompletely digested protein. Under such conditions it is not surprising that toxins are produced by the bacterial destruction of proteins in abnormal quantities in the intestines. It is probable that one of these is specially toxic for the blood and leads to a hæmolytic form of anæmia, and that another is specially toxic for nervous tissues and leads to combined degeneration of the spinal cord. In most cases the former toxin is the dominant one, but in a small minority of cases the latter is the more important. Although one or other may appear to be present alone in the early stages, it is rare for the hæmolytic toxin and still more rare for the neurotoxin to continue to be produced without the other throughout the course of the illness.

TREATMENT OF ADDISON'S (PERNICIOUS) ANÆMIA AND SUBACUTE COMBINED DEGENERATION OF THE SPINAL CORD.

The most important part of the treatment of Addison's anæmia and subacute combined degeneration is to overcome the intestinal infection and so stop the development of the neurotoxic and hæmolytic poisons. Oral sepsis should be thoroughly dealt with, as Hunter first demonstrated in 1900. Every tooth which shows the slightest sign of infection on expert clinical examination should be condemned. An X ray photograph should always be taken of all the remaining teeth, however healthy they may appear,

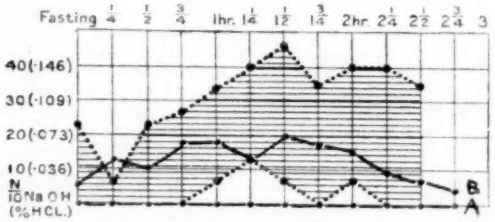
FIG. 1.



Fractional test-meals to show free HCl in a man with subacute combined degeneration of the spinal cord. A, without addition of acid—complete achlorhydria; B, with addition of ʒi. dilute HCl (B.P.) in ʒiv. water (0·3 per cent. HCl), taken with the gruel—complete achlorhydria; C, with addition of ʒiss. dilute HCl in ʒvi. of water—normal curve; D, with addition of ʒii. dilute HCl in ʒviii. water—hyperchlorhydria curve. The shaded area represents the limits for free HCl of 80 per cent. of normal people.

and the slightest sign of apical infection or periodontitis should lead to their removal. In most cases every tooth will have to be extracted. If the tonsils are infected they should be enucleated, and the nose and nasal sinuses should also be examined and, if necessary, thoroughly treated. The achlorhydria should be corrected by the administration of large doses of hydrochloric acid. In most cases we have found that a drachm and a half of dilute hydrochloric acid are required in order to compensate for the deficiency of gastric juice (Figs. 1 and 2). The acid should be

FIG. 2.



Fractional test-meals to show free HCl in a woman with subacute combined degeneration of the spinal cord. A, without addition of HCl—complete achlorhydria; B, with addition of ʒiss. dilute HCl in ℥vi. water.

added in the proportion of a drachm to 4 ounces of water in order to make a beverage, the acidity of which is about the same as that of gastric juice; lemon juice and sugar are added to make it more palatable, and it should be drunk during the course of each meal. The patient should continue to take it without intermission for the rest of his life, as even if the intestinal infection appears to be overcome the achlorhydria probably always remains. Milk which has been soured with an active lactic acid bacillus should also be given for an indefinite period. Most patients can take half a pint three times a day without difficulty.

Lastly, a vaccine should be made from any streptococcus which can be isolated from the sockets of extracted teeth, from the duodenal contents withdrawn through Ryle's tube, from the fæces and from the urine. This should be given in carefully graduated doses, beginning with very little, and slowly increasing, but it is desirable that no general reaction should follow the injections. In severe cases symptomatic treatment is required for the anæmia in the form of transfusion, arsenic given by mouth or injection, and occasionally splenectomy, and for the nervous symptoms by re-education.

It has been a special pleasure to me to refer in this second lecture to the connexion between digestive disorders and a nervous disease, because of the debt I owe to the teaching of such distinguished Parisian neurologists as Raymond, Dejerine, Marie, and Babinski, from all of whom I received much kindness and learnt many valuable lessons during the same three months as those in which I attended the clinic for disorders of digestion at the Hôpital St. Antoine of that great physician, Albert Mathieu.

References.

1. Faber, K.: Berl. klin. Woch., 1913, i., 958.
2. Conybeare, J. J.: Guy's Hosp. Reports, 1922, lxxii.
3. Bennett, T. I., and Ryle, J. A.: Ibid., 1921, lxxi., 286.
4. Bonar, T. G. D.: Ibid., 1922, lxxii.
5. Hutchison, R.: Clin. Jour., 1909, xxxii., 193.
6. Jones, C. P.: Jour. Path. and Bact., 1922, xxv., 487.
7. Campbell, J. M. H., and Conybeare, J. J.: Guy's Hosp. Reports, 1921, lxxii., 265.
8. Levine, S. A., and Ladd, W. S.: Johns Hopkins Bull., 1921, xxxii., 254.
9. Jones, A. M.: THE LANCET, 1922, ii., 1071.
10. Zadek, I.: Münch. Med. Woch., 1921, lxviii., 1346.
11. Mustelin, O.: Acta Medica Scand., 1922, lvi., 411.
12. Weinberg, F.: Deuts. Arch. f. klin. Med., 1918, cxxvi., 447.
13. Schauman, O.: Quoted by Mustelin, loc. cit. supra.
14. Hurst, A. F., and Bell, J. R.: Brain, 1922, xlv., 266.

DEEP X RAY THERAPY.

THE TECHNIQUE OF THE ERLANGEN CLINIC.

Abstract of a Lecture delivered at the City of Dublin Skin and Cancer Hospital.[1]

BY DR. W. PILGER,
ERLANGEN, BAVARIA.

I PROPOSE to begin my lecture with a brief description of the new plant, the so-called "symmetry" apparatus, used at Erlangen for deep X ray therapy. The plant consists of an inductor apparatus with a gas-mercury interrupter, and the coil is divided into two symmetrically arranged parts. By this means it is possible to raise the secondary voltage applied to the tubes up to 200,000 volts without danger of leakage. Furthermore, by this arrangement, together with the two water resistance tubes, the electrical waves which have a detrimental effect on the average voltage are suppressed. The inverse currents are suppressed by a point-plate spark gap in a tube placed between the two parts of the inductor. The apparatus has been in constant use for the last nine years in the Erlangen Clinic without getting out of order. It fulfils all the requirements needed for deep therapy—i.e., a high voltage can be produced, giving hard X rays of constant quality and quantity, continuous over a long time. Coolidge tubes as well as gas tubes can be used; an arrangement is included for automatic regeneration in order to maintain constancy in self-hardening gas tubes.

Measurement of the Dose.

The measurement of the dose of X rays is made by means of an instrument called the iontoquantimeter. It is based on the ionising effect of the X rays in the air. It has been discovered that this effect is proportional to the intensity of X rays absorbed in the air, and the intensity is proportional to the absorption of X rays in the body. The iontoquantimeter consists of (1) an ionisation chamber, and (2) an electrometer. The ionisation chamber is of aluminium about 2 to 3 inches long, inside of which is a thin aluminium needle well insulated from the wall of the chamber. This needle is connected by means of highly insulated wire with an electrometer, which can be charged by a small friction machine. All this is neatly arranged on a movable trolley.

The iontoquantimeter works as follows: By the ionising effect of the X rays in the chamber, the air in the chamber becomes a conductor for electric current; the electrometer is discharged to earth, and the time that elapses during the discharge—measured by a fixed scale—is proportional to the quantity of X rays effectively absorbed. Thus the quantity of X rays is itself measured; the shorter the time, the greater is the intensity of the rays. The quality—i.e., the wave-length of X rays, determines the power of penetration. To measure this we must determine what has been left of the X rays at a certain depth, after they have entered the body at a particular port of entry, in relation to the intensity of X rays on the surface area. Prof. H. Wintz, of Erlangen, has introduced the idea of the percentage depth dose. The dose at a depth of 10 cm. is expressed as a percentage of the dose at the surface; for instance, percentage depth dose 20 means that if the surface dose is set at 100, the depth dose at 10 cm. is 20. To measure the quality of X rays the percentage depth dose is measured; if the condition of the absorbing material (i.e., the body), the size of field, and the focal distance are the same, the percentage depth dose is an exact measurement of the quality of X rays. The measurement of the percentage depth dose is taken by means of a water phantom or wax block; the discharge time is

[1] Dr. Pilger was invited by the staff of the City of Dublin Skin and Cancer Hospital to assist them in setting up the new plant at the hospital. Although holding no official position at Erlangen Clinic, Dr. Pilger has been closely in touch with the work there.—ED. L.

measured on the surface and then below it. The times are in inverse proportion to the doses. Briefly, the percentage depth dose depends on three factors: (1) the hardness or quality of rays, (2) the focal skin distance, (3) the field size. The harder the rays the greater the focal distance, and the greater the field size the greater the percentage depth dose. It is therefore possible by changing these three factors to adapt the percentage depth dose for various pathological conditions. By means of standardised tables various doses at any other depths than 10 cm. can be calculated.

Dosage.

To calculate the dosage certain measurements of the patient's body are required, together with a fixed *biological skin dose*, the so-called unit skin dose or erythema dose—i.e., a dose that produces slight reddening after eight days, and a brownish colour after four weeks. It was established by Prof. Wintz that this dose could be fixed within a limit of about 15 per cent. The dose given in a known number of minutes' exposure, with a known apparatus and a tube running under known conditions, was standardised as 100, and produced a discharge of the iontoquantimeter in a known number of seconds. This discharge of the iontoquantimeter in a known number of seconds gave the unit skin dose.

Thus we secured calibration of the iontoquantimeter in relation to the biological effect, and could determine in advance the biological effect of other tubes by means of this instrument. The unit skin dose being standardised as 100, the proper dosage could be ascertained for various pathological conditions. The following is the dosage fixed for various conditions: Cancer, 90 to 110 per cent.; sarcoma, 70 to 80 per cent.; ovaries (sterilisation), 35 per cent.; and so on.

Technique.

To understand how the Erlangen technique is developed from the above deductions, let us first take the problem of sterilisation. Various gynæcological diseases, manifested chiefly at the age of 40 and after, are based on deficient function of the ovaries, which cause metabolic changes and other disturbances. Uterine myomas are correlated with the ovaries, and shrink when the function of the ovaries is eliminated. All these diseases are indications for suppression of the function of the ovaries by sterilisation. As I have already stated, the sterilisation dose was found to be 35 per cent., applied to the ovaries with the symmetric apparatus and Coolidge tube. When the focal distance used is 23 cm., and the field size 6×8 cm., we get about 18 per cent. at a depth of 10 cm., with 100 per cent. at the skin. The ovaries lie at a depth of about 10 cm. Two exposures of each ovary, one in front and the other behind, each lasting about half an hour, give the sterilisation dose. After from four to six weeks ovarian function ceases, and there are no more metabolic or other disturbances.

Uterine cancer can be treated in the same way. Six to seven ports of entry are required, all concentrating on the tumour, which thus gets 100–110 per cent. After six weeks the parametrium is treated in a similar way. I might here mention that treatment can be given with this apparatus in two ways: (1) concentrated or "cross-fire"; (2) distance field (to be described later). The cross-fire method is specially suitable for centrally situated cancer. But new difficulties arise with cancers of more irregular extension and eccentric situation, which make it impossible to concentrate the rays on them from every side. For instance, in cancer of the breast or skin, the only way is to give the dose in two or three exposures, which can only be done by augmenting the percentage depth dose. As before mentioned, the percentage depth dose depends upon three factors: (1) absorption (2) dispersion, and (3) amount of scattering. The loss from absorption can be reduced by using the hardest rays possible; modern apparatus gives radiation that cannot be much improved in quality by increase of voltage and filtration. Secondly, dispersion can be reduced as much as possible by augmenting focal distance, but this gain is only possible by sacrificing time. The time of exposure increases with the square of the distance; so this gain, although quite considerable, is also limited. Thirdly, the amount of scattered rays can be augmented by enlargement of the cone of irradiation—i.e., by enlarging the size of field covered by scattered rays formed when the primary rays meet the molecules of the tissue. Briefly, then, the percentage depth dose can be improved by increase both of field size and focal distance. If, for instance, the cancer lies at a depth of 1–3 cm., with a field of 6×8 cm. and a distance of 23 cm., a dose of 53 per cent. would be obtained at the inner border of the cancer. A distance of 20 cm. would give 65 per cent.; by enlarging the field to about 20×20 cm. 80–85 per cent. would obtained.

Accordingly, cancer of the breast is radiated by two distant exposures, one in front and the other behind. The distance and field size depend on the situation and size of the tumour. The irradiation doses to the tumour and the axilla may be given at the same time or separately; the supraclavicular glands must also be radiated. As the cancer dose is always calculated at the lowest limit, a second radiation is generally given in these cases. In cancer of the vulva, for instance, we have a distance field of 1 metre and give additional doses to the inguinal glands. In short, every case must be treated individually, with due regard to the above-mentioned principles.

Method of Applying Treatment.

Both the concentrated or cross-fire method and the distance field method can sometimes be employed. Their advantages are as follows. In the cross-fire method the blood recovers within about three weeks; the method is more difficult and dangerous, requiring the exercise of much skill. The distance method is comparatively simple; larger areas of the body can be radiated, more rays are absorbed, and six to eight weeks are required for the blood to recover.

General harm and nervous disorder may be caused to the body by large X ray doses, the effect being chiefly manifested in the blood circulation. A sudden fall of lymphocytes and relative leucocytosis occur; whenever possible, therefore, large cones of irradiation are avoided and concentrated doses given. The use of a compressor is recommended when the cross-fire method is adopted. Compression produces anæmia of the skin, which is thus rendered slightly less susceptible to X rays. Secondly, the movable bowels are pressed aside (in the case of abdomen), so that they do not interfere so much with the cone of radiation. For good results to be obtained the patient must be in a fit state for treatment, just as in any major operation, the condition of the blood is of paramount importance and must be ascertained.

Blood Examination.—Blood examination must be made before and after treatment, both relative and absolute counts being made. Usually we find after having given a large dose that lymphocytes are decreased, and at the same time relative leucocytosis and slight diminution of red corpuscles take place. If the patient's previous condition was good he recovers after three or four weeks if the subsequent treatment is correct.

Preparation of the Patient Before Treatment.—(1) As usual for a surgical operation; (2) nothing is to be done to the areas of radiation: (3) patient to be given a light cup of tea in the early morning and nothing else; (4) there should be no barium residue in the bowels; (5) no medicaments containing iron or other metals to be given; (6) scopolamine or morphine should be injected on the table.

After-treatment.—(1) Avoid all irritation to the radiated part of the body, from clothes, rubbing, scratching, soap, irritating ointments, &c.; (2) therefore apply for some weeks, every day, unsalted lard or unguentum leniens molle; (3) give rectal injections of pure olive oil in gynæcological cases to protect mucous membranes of rectum and colon; (4) in cancer of the bowels anastomosis before radiation is

recommended, as it prevents the radiated part from being constantly irritated by the contents of the stomach; (5) never make any incisions on the radiated areas if there happens to be swelling or induration after the treatment of X rays; (6) vomiting, headache, and thirst, which often occur after treatment, pass off as in the case of surgical operations; (7) a subcutaneous injection of physiological saline is recommended after radiation—each case being treated on its merits; (8) intravenous injections of albusol (a preparation of pure proteins) are given in cases of anæmia and when the patient is of a nervous type; (9) iron, arsenic, and other general tonics are useful; (10) calcium lactate has also been found of use.

Results.

Having regard to the above principles, good results can be obtained in all kinds of malignant growths irrespective of the question whether operable cancers should be treated only by X rays or should be operated and subsequently treated by X rays. There is no doubt that the use of this new weapon marks a great advance in the fight against cancer. Sufficient time has not yet elapsed to show whether this new branch of therapy will completely replace surgery in the fight against malignant growths; but the results obtained are, up to now, at least as good as those of surgery. In this connexion we must take into consideration the fact that in compiling statistics the surgeon only includes operable cases and excludes inoperable ones, whilst X ray therapy statistics include a large amount of inoperable cases, in which X ray is the only possible treatment.

Other types of suitable cases for X ray treatment are sarcomata, lympho-sarcomata, lympho-granulomata (Hodgkin), myomata, and climacteric diseases. The results obtained in the latter are so excellent and the treatment is so agreeable and safe that there is no possibility of discussion about it. In Germany operation is no longer performed on a myoma unless there are necrotic and infectious parts in it, or unless the tumour be so large that it threatens the function of the bladder or rectum.

During the past few years Prof. Wintz has introduced into the Gynæcological Hospital in Erlangen a remarkable means of treating chronic inflammatory conditions of the adnexa. These conditions are very tedious, for the Fallopian tubes and the ovaries resist all kinds of treatment; the growths are subject to recurrence by reason of the monthly congestions that take place in the female genital organs. By suppression of the function of the ovaries for two or three years, by a suitable dose (a little smaller than the full castration dose) of X rays applied to the ovaries excellent results in these diseases have been obtained. Other diseases which can be successfully treated by X rays are tuberculous glands, and tuberculosis of the peritoneum and joints, especially small joints.

It would take too long to enumerate all the skin diseases that can be successfully treated by X rays, but in general it has been found that the use of hard penetrating rays gives better results than the use of soft rays. Excellent results have been obtained in advanced cases of actinomycosis. Other suitable cases for treatment are glands of internal secretion, either in order to suppress hyperfunction or to stimulate deficient function. The exact dosage in these cases has not yet been completely worked out. In the treatment of Basedow's disease two-thirds of unit skin dose to the thyroids and the thymus is the best.

Summary of Diseases Treated by X Rays.

(1) All malignant growths of cancerous type; (2) sarcomata, lympho-sarcomata, lympho-granulomata; (3) myomata and diseases of the adnexa; (4) T.B. glands, peritoneum, and joints, especially small joints; (5) actinomycosis; and (6) disordered functions of glands of internal secretion.

The number of treatments ranges from one to four.

I have only given a short review of the various kinds of diseases in which X ray therapy has come to play a dominant part in consequence of the exactitude of application which is now possible. The period of inexact treatment—that is to say, the time when X rays of unknown quantity and quality were used—is now over, and a basis for further progress has been obtained.

SOME RESULTS OF DEEP X RAY THERAPY.

BY REGINALD MORTON, M.D., F.R.C.S. EDIN.,

AND

HARRIE B. LEE, D.S.O., *M.C.*, M.B., B.S. MELB.

THE time has not yet come for us to analyse the results of deep X ray therapy in malignant disease, although we now have over 600 cases to refer to, for the following reasons: (1) Over 95 per cent. of the cases treated have been sent up by surgeons or others with the comment "inoperable" or "inoperable recurrence after operation." Such being the case, the percentage of good results is necessarily small, and any figures based on such results would be misleading. (2) In a large majority of cases treated, general dissemination had already begun, and although the primary focus has disappeared after treatment, death has quickly ensued from involvement of the liver, mediastinum, &c. Here, again, figures would give quite a wrong impression of the results. (3) In regard to the comparatively few early cases treated, the longest interval since signs of the disease have disappeared is only 18 months, a period quite inadequate within which to say whether they are to be classed as cures or not.

Although averse from publishing figures we are of the opinion that the medical profession would welcome some information on the results to be expected from the treatment. The impression that in deep X ray therapy we have a certain panacea for all the ravages of "cancer" is, unfortunately, at the present time very far from being the truth, and we feel that with the following information at their disposal medical men will be in the position to put the pros and cons of the treatment before patients seeking advice on the subject. With this object in view we have taken one case from each group (arranged anatomically), and now publish the notes entered on the case history cards. Words in inverted commas are taken from written reports, either of the patient or his doctor. Other considerations being equal, we have taken cases on the following points: (1) Apparent hopelessness from a surgical point of view, and (2) the degree of benefit derived from the treatment.

We candidly admit we have picked out successful cases to show what can be done when the conditions are favourable. What exactly constitutes "favourable conditions" we do not at present know; cases that one would expect to do well have not done so; and others to whom treatment has only been given as a placebo at the urgent request of the relatives have done surprisingly well. This would seem to indicate that our technique is still faulty, and allows us to hope that as our experience widens the technique will improve, and the results will become correspondingly better. In the following notes we wish to emphasise the fact that in every case the diagnosis is that of the surgeon who referred the case to us, made in many cases on the microscopic examination of the growth after removal, in others only on the general clinical findings in the case. In this latter class we quite realise that there may be an element of doubt as to the accuracy of the diagnosis; but we do not think that experienced surgeons make many errors in cases where the signs are so marked as they have been in the great majority of patients treated. The exceptions are the few early cases of tumour

of the breast with no glandular involvement, and in these a query mark has always been put after the diagnosis.

Technique.

As this is not a technical article, a few words will suffice as to apparatus and technique. We use the "symmetry apparatus" of Schaerer, activating Muller's boiling water gas tubes. Recent visits to America and to the continent have tended to confirm the opinion that at the present time apparatus conforming in general principles to the above gives results at least equal to those obtained by any other method. Our technique has in the main been based on that of Prof. H. Wintz, of Erlangen. That is to say that for attacking deep-seated growths multiple small ports of entry are used. Quite recently we have introduced some important modifications with beneficial results, but these will be discussed later in a technical article. One important result should, however, be mentioned here. Formerly patients suffered very considerably from nausea and vomiting towards the end of the treatment, which lasted on an average about five and a half hours. The improvements mentioned above have resulted in the shortening of the average time of exposure to four hours, and nowadays the occurrence of nausea and vomiting during treatment is quite exceptional. This is rather important, for it means that we can now treat cases which previously we had to refuse, as their general condition was too low to run the risk attached to a severe attack of vomiting with its added strain on a weakened heart. With the object of obviating these unpleasant effects, some radiologists have adopted the expedient of spreading the treatment over five or six days, giving an hour at each sitting; but we are of the opinion that this lowers the efficiency of the dose very considerably. We hope to show that no case is too far gone to be beyond the chance of a considerable prolongation of life, or at least that the end will be made much less distressing both to the patients and the relatives. In this connexion we would also emphasise the great importance of having a large, light, airy room in which to give treatment, otherwise the patient is exposed to an atmosphere very considerably vitiated by the working of the apparatus, and this must result in the lowering of the general condition.

In many cases it has been found necessary to repeat the treatment. This can only be undertaken after an interval of at least six weeks, as it takes that time for the skin to recover from the previous irradiation. During the interval everything possible should be done to build up the patient's general condition. It must be remembered that exposure to the rays causes a certain amount of destruction to the red blood corpuscles. Our investigations tend to show that this destruction is not as great as has been reported; nevertheless it is important. We make a practice of doing a blood count before treatment. If the red count is below 4,000,000 the patient is given a preliminary course of intramuscular injections of iron and arsenic, or in very severe cases he is sent for a course of ultra-violet radiation. Then in all cases iron and arsenic are administered after treatment for a period of five weeks, with the result that a second dose can be safely given after the necessary six weeks' interval. In connexion with the repetition of the dose we must refer to an article just published by Prof. Wintz, which deals with certain changes in the normal tissue which may result from over-dosage with X rays. In the majority of cases these are due to faulty technique and can be avoided, but in others the trouble appears in spite of all precautions. The commonest of these is that the skin becomes more susceptible to trauma, and slight injuries produce effects out of all proportion to their severity. Healing takes place rapidly, however, and the condition does not in the slightest degree resemble an X ray burn. In all cases of disease of the bladder, prostate, and rectum a transient irritable condition of the mucous membrane is produced, which as a rule passes off rapidly, but in a small proportion of cases it persists, and results in the formation of ulcers—which, however, respond readily to treatment. The most serious sequela to over-dosage, however, is that in some breast cases which have been repeatedly irradiated a collapse of the underlying lung takes place; this is of serious import if pneumonia and bronchitis supervene, but spontaneous recovery occurs in about nine months if no other complications appear. In our experience of over 600 cases we have noticed only one case of severe injury to the skin and none of serious damage to the lung. The skin case has now quite recovered.

To sum up, we think that the treatment has now fairly established itself as a method of dealing with cases when nothing else can be done; the results in all cases make the treatment worth while, and in a few cases border on the miraculous. Whether in the early cases surgery should be discarded in favour of X rays it is as yet too early to say, but it may be stated that in all early cases treated symptoms and signs have disappeared and that so far there has been no recurrence. When surgery is resorted to we would strongly urge the employment of X ray deep therapy, either before or after operation (preferably the former), as a prophylactic measure against recurrence.

Case Reports.

Where it is possible in the following notes extracts have been taken verbatim from the reports of the surgeon interested both before and after treatment, and we hope that their publication will remove any suspicion of unconscious bias on our part. The generalisations we have appended to each class of case represent conclusions arrived at after a fairly wide experience, and any error will be found to be on the conservative side.

CASE S. 20. *Sarcoma of Naso-pharynx.*—Male aged 58. This case was referred to us by Mr. H. Tilley in October, 1921, with "a growth almost certainly sarcoma of the left ethmoidal region, spreading into the naso-pharynx, has had watering of eyes and tinnitus for last four months. Left nostril nearly blocked; no special pain, but some discomfort, and does not sleep well. Left-sided deafness." Treated Oct. 25th, 1921. On Nov. 15th the patient reported having had a very severe reaction for the first few days after treatment, followed by marked improvement. Deafness and tinnitus completely gone. Nasal breathing quite free for a time, but now becoming blocked again. Jan. 11th, 1922. Mr. Tilley reported that the growth had entirely disappeared, but that enlarged glands were palpable on the right side. This was treated and the area of the growth given a second irradiation. On Feb. 23rd the glands had entirely disappeared. In September, 1922, Mr. Tilley reported that on his last examination of the case he could find no trace of disease either in the nasal cavity or the glands.

CASE H. 9. *Lympho-sarcoma of Right Tonsil.*—Female aged 55. This case was sent by Mr. Tilley with the diagnosis of lympho-sarcoma of the right tonsil and enlarged submaxillary gland on left side. Treatment on May 22nd, 1922. On June 7th patient was seen; marvellous improvement found, growth reduced to a fraction of its former size. On August 10th Mr. Tilley reported: "I saw the patient some time ago, and she appeared to be quite well, and I have since heard from her doctor that the excellent result is still maintained." On Nov. 9th, 1922, no sign or symptom of disease was visible.

These are exceptionally good results for nose and throat cases, probably because the growth was in each instance sarcoma, as, speaking generally, we have found the various forms of sarcomata much more amenable to treatment as regards local condition than the carcinomata. Nose and throat cases are, as a rule, complicated by superadded sepsis, which in our experience always militates against a good result.

CASE S. 2. *Early Carcinoma of the Breast.* (Diagnosis queried.)—Female aged 70. In January, 1922, noticed small lump in right breast, just below nipple. On examination a tumour the size of bantam's egg, rather soft with hard centre, could be felt. Skin slightly depressed at one point. Fullness under the clavicle, but axillary and supra-clavicular areas apparently clear. Treatment on Jan. 22nd, 1922. On March 1st hard centre had disappeared, and lump was all soft and pliable. Fullness below clavicle had disappeared, and general health and appearance were much

improved. On April 20th lump had disappeared; a second treatment given as a prophylactic measure. On August 17th, 1922, Dr. C. B. Voisey reported: "Patient is still getting about, but I have not examined her for some time."

CASE S. 28. *Early Carcinoma of the Breast.* (Diagnosis queried.)—Female aged 47 (from Dr. R. Wilson). For 12 months had noticed lump in left breast gradually getting larger. On examination was found to have a lump about 5 by 7 cm. in left breast, just under nipple, freely movable. Treatment on June 7th, 1921. On Nov. 18th lump about half former size, feels harder, fibrous. Given a second treatment. On Jan. 17th, 1922, lump practically gone. In August Dr. Wilson reported patient in a good state of health.

In all early breast cases there must be considerable doubt as to the diagnosis, which could only be settled by microscopic examination; this is not possible, since such patients are usually sent to us because they have declined surgical methods. We have been successful in reducing the tumour in every case, and so far no recurrence has taken place.

CASE E. 3. *Inoperable Carcinoma of the Breast.*—Female aged 40. This case was sent by Sir Alfred Fripp in January, 1922, with inoperable carcinoma of the right breast. A large tumour of the upper inner quadrant, the overlying skin discoloured and adherent to tumour, which was fixed to chest wall. Axillary glands enlarged and palpable. Prognosis unfavourable. Treatment on Jan. 26th, 1922. On March 25th Sir Alfred Fripp reported: "Marvellous improvement. The malignant characters have all gone. The texture of the skin is normal, and the discolouration has disappeared. The growth is much reduced in size and is more freely moveable. The axilla is quite clear." Patient was given a second treatment, and on May 24th a third treatment, as a prophylactic measure; the condition remained excellent. On July 28th a small tumour with retracted skin had appeared in left breast; this was given local treatment. On Sept. 19th patient was seen, with Sir Alfred Fripp. Patient complained of great dyspnœa; on examination nothing pathological could be detected in the chest, but free fluid was found in the abdomen, the diagnosis of secondaries in the liver was made, and a bad prognosis was given. On Oct. 17th patient died.

This case was very disappointing, as complete success had been achieved as regards the local condition. The patient had deliberately concealed her condition from her husband until operative measures were out of the question, and general dissemination had probably taken place before treatment was started. Unfortunately this has been the condition in nearly all the late breast cases we have treated, so that the final result is bad, although the local results are surprisingly good.

CASE D. 9. *Recurrent Carcinoma after Amputation of Breast.*—Female aged 49. In 1915 left breast was amputated for carcinoma; in April, 1921, patient noticed a small lump appearing just below left sterno-clavicular articulation. By August this had grown to a smooth raised tumour 1¼ inches in diameter firmly adhering to the underlying structures. No cervical or axillary glands palpable. Treatment on August 4th. The lump disappeared almost immediately after treatment, but in November showed signs of enlarging, and patient then had a second treatment. Again the lump almost disappeared. In January, 1922, patient had third treatment. When last a report was received, in August, she was apparently quite cured, nothing even suspicious remaining.

CASE R. 1. *Recurrent Carcinoma after Amputation of Breast.*—Female aged 48. Left breast amputated for scirrhous carcinoma in 1916. On three subsequent occasions recurrent nodules removed. Now had two small nodules in the operation scar and a small gland at the root of the neck. Had had left-sided pleurisy at various times, and possibly the pleura was involved. Slight cachexia was apparent. Treatment on Dec. 13th, 1921. On August 20th, 1922, Dr. J. A. Gordon reported: "No recurrence of symptoms, enjoying fair health."

As a general rule the local result in post-operative recurrences in breast cases has been good, the tumour completely disappearing. But the same cannot be said for the general result, as the great majority have subsequently died from either liver or mediastinal involvement. We think life has, as a rule, been prolonged, and ulcerating open sores, distressful both to the patient and to the relatives, are practically excluded.

CASE N. 1. *Sarcoma of Lung.*—Male, aged 48, first seen with Dr. A. Bevan on Feb. 24th, 1922. He was very anæmic and weak with great dyspnœa, and had to be carried in on a stretcher. Dr. Bevan reported that a piece of rib had been removed and a large growth observed involving the upper lobe of the right lung and extending down over the middle lobe. A piece of the growth was removed and examined microscopically; the pathologist reported it to be sarcoma of the lung. In the radiograph the shadow of the tumour took up two-thirds of the right pleural cavity. Treatment was given with great difficulty owing to dyspnœa. On April 27th Dr. Bevan reported that the patient was very much better in every way, the dyspnœa being much improved. On May 16th the patient came for a second treatment. Marvellous improvement in the meantime, good colour, got about and enjoyed life. On August 12th radiograph showed that the tumour had now shrunk to the size of a walnut. Patient felt perfectly well. Given a third treatment. On Oct. 20th Dr. Bevan reported that the patient was still enjoying perfect health.

This case is quoted because: (1) it was apparently quite hopeless, and treatment was only given to pacify the patient's friends; (2) the diagnosis was confirmed microscopically; and (3) the radiographs form a permanent record of the efficacy of the treatment.

CASE W. 18. *Carcinoma of the Stomach.*—Male (medical man) aged 60. During the early months of 1922 had symptoms of severe gastric trouble, constant vomiting, and a progressive loss of weight. Radiographs taken by Dr. Stanley Melville showed very extensive involvement of the pylorus and pre-pyloric portions of the stomach. A mass was palpable in the epigastrium. Sir Hugh Rigby considered the case inoperable. Our own experience of gastric cases is very limited, and we advised this patient to go to Prof. Wintz at Erlangen. He did so, and was treated there on June 21st, 1922. On July 2nd Dr. Arthur Ricketts reported that he could feel no mass in the epigastrium, and that apart from the recurrent griping pains patient was feeling fairly free from symptoms. Early in August patient had a relapse with severe vomiting, and became very anæmic. Treatment here on August 8th. Very severe reaction after treatment, and a fatal issue seemed imminent. After 10 days, however, he started to improve, vomiting ceased, and he was able to go to the seaside. He has gone ahead ever since, eats practically everything with very little discomfort, has a much better colour, and on Oct. 14th was able to resume practice.

We prefer to let this case pass without further comment. Time alone will show what permanent benefit has been derived from treatment; the immediate result has been dramatic.

CASE T. 8. *Carcinoma of the Pancreas.*—Male aged 72. In February patient was operated on for gastric trouble. Found to be suffering from inoperable carcinoma of the pancreas. Brought here first in March, 1921, by Dr. Schrumpf from Paris, the tumour could just be felt in the area of the pancreas. Treatment in March, 1921. The patient then improved, gained weight, went about and enjoyed life. In August, 1922, when last heard of, he was still keeping well, and no signs or symptoms of disease were manifest.

Four other cases of pancreatic disease have been treated but too recently for any just estimate of the results to be made.

CASE S. 17. *Carcinoma of the Rectum.*—Female, aged 38, has had symptoms of growth in rectum since 1921. Sent to us on April 5th, 1922, by Dr. Andrew Fullerton, of Belfast, complaining of great tenesmus and pain with bowel action. Passing considerable quantities of blood and mucus. Per rectum a large growth to be felt, about 4 inches up the rectum, causing almost complete blockage. Diagnosis carcinoma of the rectum. Given routine treatment usual in these cases. On August 8th Dr. Fullerton wrote: "I can't find any tumour of bowel now—only a narrowing." Sept. 27th, 1922, patient came for a second treatment as a prophylactic measure. Feels and looks well, and has no sign or symptom of active disease.

Speaking generally, the rectal cases have done very well indeed. The local symptoms in all cases have abated, obstruction has been less, hæmorrhage has ceased, and the palpable tumour has become distinctly smaller. With this local improvement has followed naturally a dramatic change in the general condition. The colour improves, weight is increased, and the patient is able to enjoy life. What the ultimate result is going to be it is too early to say,

but we maintain that no case should be submitted to a colostomy until deep therapy has been given a trial, and we feel sure that the necessity for operation would vanish.

CASE S. 14. *Carcinoma of Prostate.*—Male aged 66. Sent by Sir J. Thomson Walker with diagnosis of inoperable malignant prostate. General condition bad, confined to bed, having narcotics to relieve pain, which was intense. Growth more noticeable on left side. Treatment on Feb. 13th, 1922. On May 24th was examined at nursing home. No enlargement of middle lobe palpable, left lobe about half former size. No trouble with micturition, but rectum is irritable. General condition is much improved, but patient still too weak to get about. On June 13th a second treatment given, with precautions to avoid rectal irritation as far as possible. On August 20th Sir J. Thomson Walker reported: "Growth appears to be smaller, improved in general condition, and regained good colour. No further loss of weight. Able to get about better, and has very much less pain."

The prostatic cases, whether malignant or simple hypertrophy, have been very successful indeed, unless complicated by a bad cystitis or pyonephrosis. In all cases the tumour has become markedly diminished in size. Hæmorrhage has ceased, and micturition has become much easier. Dissemination in these cases (and the same applies to rectal cases) is always slow, and with the abatement of local symptoms a very considerable prolongation of comfortable existence can be expected.

CASE Y. 1. *Carcinoma of the Urethra.*—Female aged 67. Sent by Dr. J. E. Frere with diagnosis of slowly progressive carcinoma of the urethra involving the wall of the vagina. Has been treated by radium, which held it up for a time, but it is now slowly progressing. Treatment on March 24th, 1921. On April 14th patient was more comfortable than for some months past; blood-stained discharge has ceased. On July 17th Dr. Gordon Luker and Dr. Frere examined her and reported: "Very definite improvement in local condition, she seems very well and has no untoward symptoms." On Sept. 3rd, 1922, Dr. Frere reported patient doing very well; she was last examined by Dr. Luker in February, 1922.

The general remarks on prostatic cases apply to bladder cases in general.

CASE H. 5. *Inoperable Carcinoma of the Cervix.*—Female aged 50. Sent to us in November, 1921, by Mr. Aslett Baldwin, with a history of an offensive sanious discharge from the vagina since February, 1921, increasing latterly with pain in the back and right groin. Diagnosed: "Inoperable breaking-down carcinoma of cervix." Treatment on Nov. 7th, 1921. On Jan. 4th, 1922, per vaginam the cervix was found to be contracted and firm; discharge had ceased, and pain had almost entirely gone. General health was much improved. Given second treatment, mainly to left side. On March 7th, 1922, no ulceration or friability of cervix could be detected. On May 18th patient had some hæmorrhage and recurrence of pain. Per vaginam conditions remained as before; treated. On July 27th nothing friable in vagina. Uterus moved freely. Patient looked very well generally. Still had some discharge per vaginam; treated.

This is fairly typical history in this class of case. Improvement is always slow but progressive, and in no case that we have treated has general dissemination taken place. In our opinion the danger of the treatment causing vesico-vaginal or recto-vaginal fistulæ has been exaggerated. We have had only one such case, and even here we think that the disease rather than the treatment was responsible. We have had no experience in treating "operable" cases, but judging by the results obtained in the severe cases, and the published figures of the Erlangen Clinic, there seems to be every hope of treating them successfully.

Messrs. Methuen and Co. are bringing out an eighth edition of Miss M. N. Oxford's "Handbook of Nursing."

ROYAL MICROSCOPICAL SOCIETY.—The annual meeting will be held in the Lecture Hall at 20, Hanover-square, London, W. 1, on Jan. 17th, at 7.30 for 8 P.M., when Prof. Frederic J. Cheshire will deliver the presidential address on the Early History of the Polarising Microscope.—A new combined section of the Society, dealing with the practical use of the microscope in connexion with industrial research, has been formed. The inaugural meeting will be held at 20, Hanover-square, W. 1, on Wednesday, Jan. 24th, at 7 P.M., Prof. Cheshire presiding.

THE ATAVISTIC-DEGENERATIVE DIATHESIS OF TUBERCULOSIS.

BY W. C. RIVERS, M.R.C.S. ENG., D.P.H.,
TUBERCULOSIS OFFICER, BARNSLEY DISTRICT, WEST RIDING, YORKS.

A GOOD way of investigating scientifically intrinsic predisposition, amongst the civilised races, to tubercle, is one that has proved fruitful in other fields of inquiry. It consists in the accumulation of *individual characters* which can be shown (*a*) to be commoner in the tuberculous than in the non-tuberculous, and (*b*) not to be themselves caused by that disease. Of course, prominence will be given to such of these individual characters as, from our knowledge of tuberculosis, we can recognise as manifestly increasing their possessors' liability to it. From such an accumulation of facts, some generalisation, and many useful inferences, should be possible.

Now already, in the literature, there have been recorded certain individual characters which all fulfil postulate (*a*), and of which some also fulfil—and none have been shown to fail to fulfil—postulate (*b*). These observations are epitomised here for several reasons. Firstly, their general neglect by recent authors—a phenomenon due to the fact that many of these writers are general physicians, bacteriologists, or sanitarians, who have necessarily inadequate time for the huge special subject of tuberculosis. Secondly, current medical literature is a mighty, but fruitful, maze into which it is a beneficial act to introduce more plan. And lastly, with the facts set out, however briefly, before us, there do appear grounds, of a magnitude previously unsuspected, for the generalisation now beginning to be made, the generalisation adumbrated in the title of these remarks. To begin with the nervous system.

Nervous System.

The especial liability to tubercle of the insane is a truism. That such liability is not merely a matter of environment, or of depressed health produced by mental affection, is proved by such details as the persistence of a high incidence of tuberculosis in modern healthy asylums, where the life is largely out-door; as the especial vulnerability of idiots and the subjects of dementia præcox and of primary dementia; as the tuberculosis of lunatics, like the tuberculosis of savages (and, to a less extent, of infants) being acute, and attacking mainly, to begin with, the lymphatic system and the lungs. Further, the excess in question is much too big to be reasonably attributable to extrinsic causes. In 1901 in England and Wales, in a population of 32½ millions, there were about 60,000 deaths from tuberculosis, a death-rate under 0·2 per cent. The same figure for borough and county asylums was 15·8. No amount of correction for age and sex distribution could leave that disparity other than huge. Moreover, the insane are prone also to pulmonary gangrene, whilst asylum attendants show no special proclivity either to that disease or to tubercle. Lastly, Sir Frederick Mott, from autopsy investigation, has pronounced against tuberculosis being acquired in the asylum.

Circulation.

It is again a commonplace that congenital cardiac patients, at any rate those with the commonest variety of lesion—pulmonary stenosis plus defect of the ventricular septum (trilocular heart)—very often die of phthisis. There is then the old observation that the heart and arteries of consumptives are exceptionally small. That such smallness is not wholly due to wasting from ill-nutrition and under-functioning, but starts from an autochthonous constitutional anomaly, follows for these reasons: (1) Laennec,[1] though thinking the exiguity of the blood-vessels of consumptives due to long-standing diminution of the

blood in them, doubted that the heart itself was atrophied, because of its bright-red colour. (2) Of those[2] whose autopsy work bears on the point, there is a slight majority (6 against 4) in favour of the autochthonous theory; and the six include the great names of Virchow and Rokitansky, as against only Stokes on the other side. (3) The much superior evidence from orthodiagraphic radiological examination, applicable in early disease, before wasting and debility have had time to take effect upon the circulatory apparatus, speaks clearly for a constitutional peculiarity. The small median-placed heart hanging from the arch of the aorta like a drop of liquid (*Tropfenherz*) is an appearance so much commoner in consumptives than in the non-tuberculous as to help in diagnosis. Moreover, as with many predispositional stigmata, the occasional occurrence of small heart and arteries in the non-tuberculous is further evidence that this hypoplasia is not of tuberculo-toxic origin. Brugsch,[3] from rontgenological observations on healthy soldiers, found in men of equal size individual differences in arterial capacity of as much as 100 per cent. Guarini[4] is another recent author who similarly concludes that the small median heart is originally hypoplastic, correlated with hypo-evolution of other organs, pointing to a weak constitution, and to be found in those merely predisposed to tubercle. Amongst subjects actually tuberculous it occurred in 68 per cent. According to Kraus,[5] the *Tropfenherz* may be observed in weakly children, as early as 7 or 8 years old. Stiller,[6] who has described the asthenic type of constitution, considers small heart but a part of it, and thus a predisposing factor to pulmonary tubercle. All this verifies the impressive dead-house work of Beneke (mentioned in Osler's well-known text-book), which bore out the observations of Rokitansky and of Virchow. All this harmonises, too, with familiar clinical observations—like v. Strümpell's, that a quick weak pulse will sometimes persist after phthisis has become quiescent (having, indeed, preceded the disease), especially in tall, narrow-chested subjects, in whom *Tropfenherz* is probably specially frequent; or like Grancher's, that phthisical predisposition consisted in a long-continued "amoindrissement des actes fondamentaux de la vie." The low blood pressure of consumptives may be another associated phenomenon; for Naucler[7] found cachexia in cancer unaccompanied by any great fall in blood pressure, whereas, on the contrary, cachexia in phthisis showed very low readings, the hearts of lightest weights, moreover, being found in those consumptives whose blood pressure had been lowest. Lastly, Virchow's finding of the like exiguous circulatory mechanism in chlorotics helps to explain the frequency of chlorosis in the history given by female consumptives.

Skin and Appendages.

To begin again with a text-book commonplace, hypertrichosis of the back is mentioned as a characteristic of tuberculous children. In children with bone and joint tubercle I[8] found it more than four times as often as in a comparable control; moreover, the evidence was against its being tuberculo-toxic. Shrubsall,[9] investigating anthropometrically hospital out-patients, compared the pigmentary findings in 15,000 of them with those given for the lower classes by the well-known authority Beddoes, concluding that pulmonary tubercle favoured brunettes, and that in bone or glandular disease fair traits predominated; these results were not due to any special darkness of hospital patients as a class. In Sweden Lundborg[10] found brown eyes in 9 per cent. of male and in 12·5 per cent. of female consumptives, as against 6·2 per cent. and 3·9 per cent. in male and female students respectively, and 4·5 per cent. in military recruits. This special frequency of darkness characterised also, if to a less extent, criminals and deaf-mutes. To test Shrubsall's further result, as to a difference in the complexion of consumptives and of surgical tuberculous patients, I noted the pigmentary data in Lundborg's second-cited work. Complexion not being always noted, I obtained particulars of 444 dark-complexioned persons, and 948 fair. In these the percentage frequencies of tubercle were:—

	Dark.	Fair.
Pulmonary tubercle	4·7 ..	0·6
Non-pulmonary tubercle ..	4·4 ..	1·4

This is some slight corroboration. It shows great deficiency, in a fair race, of fair people among consumptives, and considerable deficiency amongst surgical tuberculous patients. Red hair I[8] observed in 7 per cent. of 353 cases of juvenile bone and joint tubercle, but only in 3·4 per cent. of a comparable control. Lundborg ("Hereditas," p. 175) notes the same trait twice to thrice as frequently in adolescent and adult tuberculous patients (variety of disease not stated) as in normal students and in soldiers; criminals showed even greater excess. Queyrat[11] recorded tuberculosis in 52 out of 56 subjects showing "partial erythrism"—i.e., dark head hair coinciding with red pubic hair. The last observation is recalled by Prof. Schmidt's[12] mention of a "Haardisharmonie" (dark brown head hair along with a fox-red moustache, the red tint of which may not show at first) as strongly indicative of predisposition to tubercle, especially tuberculous peritonitis; and the two preceding ones by White's,[13] that red haired persons were said to be peculiarly subject to scrofula, and by Landouzy's[14] opinion that four-fifths of the serious illness amongst patients with a fine white skin and red hair was tuberculosis.

Ichthyosis I[15 8] found seven times as often in consumptives, and nearly thrice as often in bone tubercle, as in comparable controls. Searching the literature I found corroboration from Gaskoin,[17] Tommasolli,[16] and du Mesnil.[18] Unbiased study goes to show that the ichthyosis precedes the tubercle. The same will surely be granted of pigmentary characters like brown eyes and red hair.

Defects, Abnormalities, Malformation.

Osler wrote that—

> ". . . Certain morbid conditions of the abdominal organs predispose to the development of the disease [tuberculous peritonitis] . . . the frequency with which the condition is met with in operations upon ovarian tumours has been commented upon by gynæcologists . . . a very interesting feature is the occurrence of tuberculosis in hernial sacs . . . in a majority of instances it has been discovered accidentally during the operation for radical cure or for strangulation."[19]

The particular case of *cardiac* malformation has been adduced above, whilst as regards the *respiratory tract* the association of phthisis with non-tuberculous defect of its upper (naso-pharyngeal) part will be found fully discussed in a source[15] already cited. Both obstructive and atrophic abnormalities are there shown to be much commoner in consumptives, quite independently of their disease, than in normals. *Polymastia* was found by Iwai[20] to be roughly twice as frequent in tuberculous and suspected tuberculous patients as in non-tuberculous ones, a finding confirmed by Otani, both inquiries being probably suggested by the similar conclusion of a European worker in Japan. Other abnormalities may be found mentioned in a comparison, both by external examination and by autopsy, made by Polanski.[21] Inter alia this revealed, amongst the tuberculous, a five-fold preponderance of abnormally shaped hard palate, and of pelvic projection of the fourth lumbar vertebra (making an accessory promontory); fourfold excess of absence of beard in men, of floating tenth rib, and of abnormally shaped forehead; a threefold, or nearly threefold, of misformed nose, of double hair whorl, of transposed pubic hair area (i.e., triangular instead of diamond-shaped in men, diamond-shaped instead of triangular in women), of aural anomalies, of bifurcation of the spinous processes of the lumbar and lower dorsal vertebræ, of bifurcated extremity of the sixth or seventh rib, of fenestrated xiphoid appendage, of hypoplasia of the heart, aorta, and vessels, and of abnormally shaped spleen. Also the

tuberculous subjects were distinguished by a longer reach (arms laterally outstretched) in proportion to their height. The investigation was suggested by a previous one—noticed by Virchow—of Zielinski,[22] who autopsied 854 consumptives, but without control observations, and recorded the above-mentioned with other abnormalities. This is all the anticipation Polanski seems aware of, but his results are now amply corroborated. Thus the observations on abnormal shape of palate and nose recall at least four independent ones (Jarvis, Talbot, Zickgraf, and myself) to the same effect. "Costa decima fluctuans" is, according to Stiller,[6] a stigma of the asthenic type of constitution, and it was associated with thin bones, flat narrow thorax, broad intercostal spaces, puny musculature and pale skin, whether tuberculosis was also present or not (l.c., p. 169). It was also associated with enteroptosis, which reminds us of Arbuthnot Lane's association of that last condition with tubercle. In this connexion a recent paper by Davies-Colley[23] is noteworthy. He describes abnormal mobility of the lower ribs as an ailment unmentioned in the text-books; in two cases given the tenth rib was at fault, and one of these was complicated by prolapse of the cæcum and ascending colon. Again, as regards pubic hair distribution, and also beardlessness, Kretschmer[24] found frequently associated with the asthenic type of build common in dementia præcox, male subjects characterised by feminine conformation of pubic hair. In dementia præcox generally, too, the beard was scanty. This asthenic type of build is almost identical with that of "habitus phthisicus." The mention of aural anomalies is in harmony with the observation of Rossolimo[25] that absence of ear lobule is often met with in the tuberculous; while Holeman,[26] from experience of American naval seamen invalided for tuberculosis, recorded, in a paper noticed abroad, the frequency amongst them of degenerative stigmata, especially deformities of the external pinna. Lastly, hypoplasia of the circulatory system we have already had mention of by many others.

Two ocular anomalies remain. Blue sclerotics have been often described as characterising adult patients with bone and joint tubercle; it is never connected with this, though, that blue sclerotics are also found with fragilitas ossium. Possibly, then, this peculiarity of the eyes signifies bony defect. Finally, that squint is in excess in adult or juvenile phthisis, but not in bone tubercle, I have recorded in sources already given, and in THE LANCET, 1921, i., 319, where I adduced the confirmation to be obtained from Luzzatto. My observation as to the association of left-handedness with squint, an ophthalmologist[27] has been good enough to confirm lately from independent work.

Recapitulation.

There are many other characters—of general development, of the alimentary system, of thoracic conformation—which have been left out because at present they do not satisfy both requirements laid down at the outset of these remarks. We may, however, use them to point the reflection that with no other disease has there been half the discussion about diathesis that there has with tuberculosis; so that to all this smoke there must be some fire. Another a priori argument is that since debilitation by disease or bad hygiene—phænotypic factors, to use the latest terminology—admittedly predisposes to tubercle, then native constitutional weakness or defect—genotypic agencies—should do the same.

But even the "short list" of stigmata above enumerated is imposing. Will anyone ascribe them all to tuberculo-toxæmia? If so, if tuberculous toxin can render a child an idiot, a youth a dement; malform the fœtal heart and stunt the arteries; grow hairs on the back, stop them growing on the chin, and on the head turn them sometimes black, sometimes red; turn the eyes brown, too, and make them squint; reveal itself as a common cause of ichthyosis; now pinch and now widen the nose; and, growing violent, loosen the lower ribs and split the vertebral spines—granted all this, the old myth of Proteus is outdone by the new myth of tuberculo-toxæmia. Yet there has been repeated at Brussels in 1922 what was said there in 1910, that the so-called stigmata of tuberculous predisposition are nothing but the signs of an already present infection.

Hyper-Variability, Atavism, Degeneration.

Now, on a better hypothesis of causation, nearly all these curious characteristics come into line; and what then confronts us is not gross absurdity but an advance in knowledge. Beginning again with *insanity*, we find it the condition par excellence in which stigmata of degeneration are found: in no varieties of it so frequently as in idiocy and dementia præcox, the subjects of which are also especially prone to tubercle. Rehm[28] found stigmata of degeneracy much more frequently in epileptics and the subjects of dementia præcox than in manic-depressive lunatics; Voisin[29] spoke of them as very numerous and excessively diverse in idiots. As for *trilocular heart* or an approach thereto, that is immediately reminiscent of the normally incomplete ventricular septum in dipnoi and in the lower reptilia.[30] *Hypertrichosis of the back and limbs* is mentioned by Darwin[31] as occurring in delicate children, not as long sparse hairs over an inflamed joint, of which also he was aware, but as persistent fœtal lanugo, the rudiment of the uniform hairy coat of animals, an atavistic "theroid" trait he mentions as frequent in idiots. There is evidence that in northern races *darkness of complexion* is an atavistic-degenerative trait. Lundborg (l.c.) found dark eyes especially in the Swedish lower orders, who he states were of more mixed race than their social superiors. Now we must remember here, as often henceforth, that crossing of race is a fertile source of reversion or atavism (cf. Darwin's classical reconstruction of the primitive jungle fowl by interbreeding two modern varieties of poultry), also, probably, to take a wider view, of hyper-variability. Lundborg found this eye-darkness to characterise also Swedish criminals and deaf-mutes. If we remember Lombroso's and Nordau's theory of the degenerative character of genius, it is significant that Havelock Ellis[32] gives dark complexion as highly characteristic of noted British actors and actresses. Now, as I have shown,[33] amongst these very persons mixed ancestry, or miscegenation, is especially common too, commoner than in any other class of British notabilities. This special darkness of complexion in a northern race is, therefore, probably in the nature of a variation indicative of general abnormality. The same may be said of *red hair*, with the addition that it is a distinct atavism. In a source cited last was given a series of authorities, from Eusebius to Karl Pearson, connecting red hair with crossing of race, whilst it was recalled that primitive man was red-haired; also evidence from the Royal Albert Asylum, published in Pearson's monograph aforesaid, was cited, showing red hair in excess amongst imbeciles. Another point brought out was a close association of black hair with red. It is especially interesting, in view of Schmidt's "Haardisharmonie" (v.s.) in which sometimes the red tint appeared late, that the anthropologist Kohlbrugge[34] describes in Java apes of a species in which both red and black specimens occur, and which sometimes reciprocally change colour.

Ichthyosis is frequent in the insane[35]; according to my own comparison, about five times as frequent as in the sane. There are theories of its atavistic nature, advanced by Bowen and by Renshaw, whilst its great commonness in living tribes in Asia (Hirsch) and its being the normal condition in a locality in Europe (Allbutt and Rolleston) is further proof of its atavistic origin—and also of its not being tuberculous or tuberculo-toxic. Ichthyosis is also notoriously associated with malformations. *Nasal obstruction and mouth-breathing* commonly occur in idiots, especially the Mongolian variety, who almost all die of tubercle. *Polymastia* is a "theroid" arrangement of

the milk glands, and in the male suggests feminism and bisexuality. Macalister[36] confirms Iwai that female subjects of polymastia are especially liable to multiple gestation, adding that they are also characterised by inability to metabolise much animal food. He thinks such inability, as also possibly dislike of fat, due to reversion to a primitive vegetarian diet habit. We recall that dislike of fat is reckoned common in the tuberculous and precedent to their disease. *Absence of beard* in males, and *abnormally shaped forehead*, are given by alienists (Marie, Voisin) as stigmata of degeneracy. Klapp's[37] explanation of *floating tenth rib* is that in man the lower ribs are not in morphological equilibrium, but are undergoing phylogenetic regression, from segmental shortening of the trunk originating in the assumption of the upright posture. This goes well with Stiller's aforementioned association of floating tenth rib with enteroptosis, for the phylogenetic explanation of the latter condition by Glénard and by Arbuthnot Lane, who connects it with tuberculosis, is familiar. *Double hair whorl* is another stigma of degeneracy given by French neurologists (Féré, &c.). *Pubic hair area of shape appropriate to the opposite sex* is obviously a mark of masculism or feminism, as the case may be, and thus of a condition common in the insane. It also points to bisexuality, a primitive condition. Likewise frequent in the insane are congenital *aural anomalies*. The form particularly mentioned, absence of lobule, is according to Darwin (l.c., p. 15), and the anthropologist Waitz,[38] normal to all primates except man, though gorillas possess a rudiment, whilst negroes often show an absence of lobule. Another bodily character of negroes—namely, musculature—is stated by the physiologist Luciani,[39] as also by Professor Keith,[40] to be more primitive than that of Europeans. Polanski gives figures to demonstrate *long reach in proportion to height* as a character of the lower primates, of uncivilised races, and of criminals.

Conclusion.

A few of the above characters, for example, cardiac hypoplasia, have been ascribed to persistence of a childish condition—that is, to infantilism. But this generalisation is obviously not inclusive enough. Lundborg's idea is that predisposition to tubercle is from degeneration due to "blood chaos" from race-mixture. This, again, is no doubt valid as a partial explanation, but atavistic reversion to a primitive susceptibility to tuberculosis (seen in uncivilised races) needs mention, whilst race-mixture can hardly be held universally responsible for tuberculous predisposition. I think its influence will be found operative only, or mainly, in certain cases. Thus of 175 juvenile consumptives I have notes of, 22 showed either squint, ichthyosis, red hair, or persistent lanugo. In these 22 there was one miscegenate (mixed race) to every seven; but in the remainder only one miscegenate to every 17. Again, the evidence for the influence of miscegenation is much more certainly established by the method here adopted, that of individual investigation, than by Lundborg's arguments from comparing the tuberculosis statistics of one country with another, which involves obvious fallacies; or from the prevalence of tuberculosis in a district at different periods, which may be due to many factors, say the introduction of industrialisation and urbanisation, with resulting development of individual or racial immunity: or from increase of *perlsucht* after native resistant cattle had been crossed, for here, as in India (Lankester) and Japan, the outcross was with tubercle-susceptible European stock, so that the offspring could have inherited liability to tubercle from one side of the pedigree, not developed it as the result of miscegenation. Still, Lundborg's work is valuable general corroboration. Polanski, perhaps, comes nearer the whole truth when he compares the diathesis of tuberculosis with that of several mental and nervous ailments. This leaves out predisposition by defect (e.g., nasal) which obviously increases opportunities of infection. The most sufficing and philosophic conception at present open to us would seem to be the recognition, as unduly frequent in tuberculous subjects of civilised races, of an hyper-variability, sometimes connected with miscegenation, miscegenation not with the uncivilised, but so to say inter se. Examples of crosses that I have encountered are English-Italian, English-German, English-Scandinavian, English-French, English-Irish, Scotch, or Welsh. Thus the consumptive of civilised race, compared with the rest of his community, is "less often in the mean, more often in the extreme."[15]

Practical deductions from all this as regards prophylaxis and diagnosis hardly need mentioning. What does need stress is the eugenic aspect—as regards tuberculous patients bodily degenerate, and without countervailing intellectual superiority.

Bibliography.

1. Laennec, R.: A Treatise on the Diseases of the Chest, second edition, Forbes's transl., London, 1827, p. 286.
2. Louis, P. C. A.: Recherches anatomiques, pathologiques et thérapeutiques sur la phtisie, Paris, 1845. Rokitansky, K.: A Manual of Pathological Anatomy, New Sydenham Soc., transl., 1852. Stokes, W.: The Diseases of the Heart and the Aorta, Dublin, 1854, p. 299. Peacock: Monthly Journal of Medical Science, London, 1854. Engel: Wiener med. Wochenschrift, No. 46, 1863. Virchow, R.: Ueber die Chlorose, &c., Berlin, 1872, p. 26. Benecke, V.: Die Anatomischen Grundlagen der Konstitutionsanomalien des Menschen, 1878; Konstitution und konstitutionelles Kranksein des Menschen, Marburg, 1881. Oppenheimer: Muenchener med. Wochenschrift, 1895, p. 467. Hirsch: Deutsches Archiv für klinische Medicin, 1899, Bd. lxiv., p. 597. Muller: Cit. by Bandelier and Roepke: A Clinical System of Tuberculosis, second edition, Hunt's transl., 1913, p. 12.
3. Brugsch, T.: Allgemeine Prognostik, Berlin, 1918, p. 65.
4. Guarini, C.: La Riforma Medica, June 22nd, 1918; abstract in THE LANCET, August 17th, 1918; and in Zentralblatt für die gesamte Tuberkulose-Forschung, June 28th, 1919.
5. Kraus: Deutsche med. Wochenschrift, Sept. 13th, 1917.
6. Stiller, B.: Die Asthenische Konstitutionskrankheit, Stuttgart, 1907, p. 175.
7. Naucler, R.: Acta med. Scand., 1919, lii., 271; abstract in Tubercle, May, 1921.
8. Rivers, W. C.: British Journal of Children's Diseases, April–December, 1920.
9. Shrubsall, F. C.: Brit. Med. Jour., Dec. 24th and 31st, 1904, ii., 1689, 1747; Proc. Roy. Soc. Med., vol. iv., No. 7, May, 1911.
10. Lundborg, H.: Hereditas (Sweden), i., 1920, p. 169. Medizinisch-biologische Familienforschungen, Jena, 1913.
11. Queyrat, E.: Le Progrès Médical, No. 45, 1920, p. 487.
12. Schmidt, R.: Wiener klin. Wochenschrift, No. 48, 1911, p. 1662.
13. White, T.: A Treatise on Struma or Scrofula, London, 1784, p. 9.
14. Landouzy, L.: Le Progrès Médical, x., 1882, p. 684.
15. Rivers, W. C.: Three Clinical Studies in Tuberculous Predisposition, London, 1917, p. 2 et seq.
16. Tommasolli: Annales de Dermatologie et Syphilis, 1893, pp. 537, 709.
17. Gaskoin: St. George's Hospital Reports, London, 1877–79.
18. Du Mesnil: Thèse de Montpellier, 1902.
19. Osler, W.: Principles and Practice of Medicine, sixth edition, London, 1906, p. 310.
20. Iwai, T.: THE LANCET, Oct. 5th, 1907. Otani, S., idem (quoted by T. Iwai).
21. Polanski, W.: Zeitschrift für Tuberkulose, Bd. vi., H. i., 1904.
22. Zielinski, E. W.: Fortschritte der Medicin, Bd. xviii., 1900, p. 621.
23. Davies-Colley, R.: Brit. Med. Jour., 1922, i., 432.
24. Kretschmer, E.: Körperbau und Charakter, second edit., Berlin, 1922, pp. 16, 51.
25. Rossolimo: Wiener klin. Wochenschrift, 1908, No. 22.
26. Holeman: Medical Record, Dec. 18th, 1915.
27. Inman, W. S.: Brit. Jour. of Psychology, vol. ii., part 1, October, 1921.
28. Rehm: Das Manisch-melancholische Irresein, Berlin, 1919; cit. by Kretschmer, l.c., p. 55.
29. Voisin, J.: L'Idiotie, Paris, 1893, p. 65.
30. Wiedersheim, R., and Parker, W. N.: Comparative Anatomy of Vertebrates, third edition, London, 1907.
31. Darwin, R.: Descent of Man, second edition, chap. ii., p. 36.
32. Ellis, H. H.: A Study of British Genius, London, 1904, p. 214.
33. Rivers, W. C.: THE LANCET (letter signed "Caduceus"), August, 1919, ii., 300; The Practitioner, June, 1921; and more fully in a forthcoming book, Sexuological Essays.
34. Kohlbrugge: Nederlansch Tijdschrift voor Geneeskunde, 1908, p. 548 et seq.
35. Marie, A., and Dide: Traité International de Psychologie Pathologique, 1910, T. i., p. 315.
36. Macalister, C. J.: Address to Liverpool Heredity Society, Dec. 9th, 1921.
37. Klapp, R.: Archiv für klin. Chirurgie, Bd. cxvi., H. 4, 1921.
38. Waitz, T.: Introduction to Anthropology, Collingwood's transl., London, 1863, p. 91.
39. Luciani, L.: Human Physiology, Eng. transl., London, 1921, vol. v., p. 333.
40. Keith, Sir A.: The Human Body, p. 92.

A NOTE ON THE STORAGE OF VITAMIN A IN THE LIVER OF THE RAT.

BY KATHARINE H. COWARD, M.Sc.
(BEIT MEMORIAL RESEARCH FELLOW),
JOAN L. LUSH,
AND
M. GRACE PALMER.
(From the Biochemical Laboratories, Institute of Physiology, University College, London.)

THE occurrence of vitamin A in various glandular organs of the body has been reported by several investigators in this subject. Thus McCollum and Davis (1915) found it in pig's kidney and in cod's testicle; Osborne and Mendel (1917, 1918) found it in pig's kidney and in pig's liver; and McCollum, Simmonds, and Parsons (1921) in liver. Further, Zilva and Drummond (1922) found the fresh roe of various fish—especially the cod—and also ox liver to be valuable sources of the vitamin. Other reserves in the body are generally found in the fat, both subcutaneous and subperitoneal. No attempt was made to determine the minimum dosage of any particular tissue necessary to restore growth in rats which had become steady in weight on a diet deficient in vitamin A (the only means at present known of estimating the vitamin content). Hence the great variation in the concentration of this factor escaped the notice of these observers, and it was only when the influence of feed on the vitamin content of the milk of cows had been clearly demonstrated by Drummond, Coward, and Watson (1921) that it occurred to one of us that the vitamin content of the liver of any animal probably also varied considerably with the amount of the factor supplied in the food. It was decided, therefore, to investigate the influence of the diet of the rat on the storage of this factor in the liver.

FIG. 1.

In each figure the dotted line indicates the preparatory period on diet deficient in vitamin A.

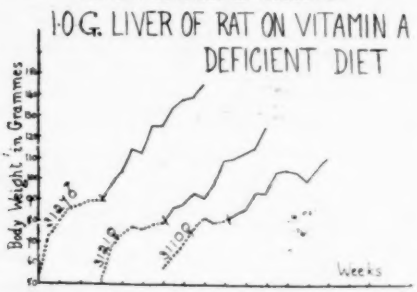
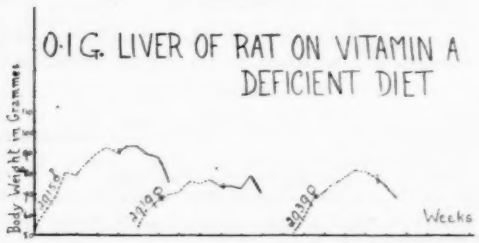


FIG. 3.



Experimental Method.

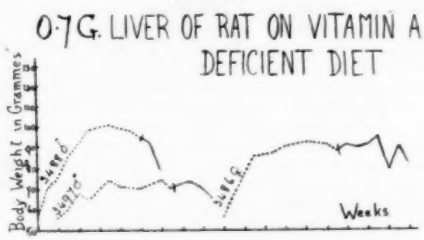
Test Animals.—Rats were prepared in the usual way adopted in this laboratory (Drummond and Coward (1920), and Coward and Drummond (1921)), and when they had become steady in weight, small doses of the livers of rats fed according to the description below, were given to them each morning before their daily ration of basal diet was put into the cage.

The Livers Used in Feeding.—One series of rats was fed on our basal diet deficient in vitamin A and only those rats were used which had remained steady in weight at 110–120 g. for about 14 days. The fresh liver was fed to the test rats in doses of 0·02, 0·1, 0·5, 0·7, and 1·0 g. respectively. A second series of rats was fed on a diet similar to the above, except that butter was substituted for the hardened cotton-seed oil, and the casein was not heated, as there was no object in destroying the vitamin. The dosage in this case was 0·1, 0·3, and 0·5 g. respectively.

Results.

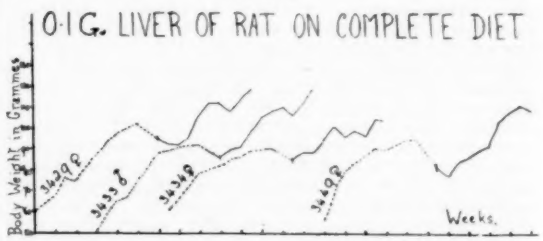
No growth was obtained on feeding less than 1·0 g. of liver of rats fed on the basal diet deficient in vitamin A (Figs. 1, 2, and 3). It is interesting to note the marked difference between the response to supplements of 0·7 and 1·0 g. The experiments of Zilva and Miura (1921) show that a certain concentration of the vitamin given to rats may have no apparent results, while a slight increase in the dosage may be sufficient to produce very marked results. In all cases where growth was not resumed, the general appearance of the rats remained poor, their coats were rough, and the majority showed marked symptoms of keratomalacia. Those rats, however, which received a supplement of 1·0 g. of these livers gradually returned to the condition of normal healthy animals.

FIG. 2.



In contrast to these results, good growth was obtained by feeding 0·1 g. of the liver of a rat fed on the vitamin-rich diet (Fig. 4). The general condition of the test animals improved very rapidly even on this small dosage. Cases of acute keratomalacia quickly cleared up, the coats of the rats became smooth and glossy, and the rats themselves were much more active. Higher doses of 0·3 and 0·5 g. gave very similar growth curves, so that it is probable that the minimum dosage required to give normal growth in this case is even less than 0·1 g.

FIG. 4.



Summary and Conclusion.

1. The concentration of vitamin A in the liver of the rat varies with the concentration of this factor in the diet.

2. On being deprived of vitamin A, the rat ceases to grow apparently before the store of vitamin in its liver is completely exhausted.

3. It would appear from this that a reserve is necessary for some function of the animal body other than growth.

NOTE.—Confirmation of the above has recently been obtained by testing the unsaponifiable matter of the livers of rats fed on a complete diet and that from rats fed on a diet deficient in vitamin A. Test-rats resumed growth on a daily dosage of 0·02 g. of the former, while an equal dose of the latter failed to show any growth-promoting power. Moreover, a test was carried out on the fresh livers of rats which had been fed on a deficient diet for much longer periods of time than those used in the first experiment; in fact, the livers were not used until the rats showed a definite decline in weight. 1·0 g. of the liver then completely failed to restore growth in the test animals, which would appear to indicate that the store of vitamin A retained in the liver on the cessation of growth is used up for some other purpose during the period when the rat remains stationary in weight.

References.—Coward and Drummond: Biochem. Jour., 1921 xv., 530. Drummond and Coward: Ibid., 1920, xiv., 661. Drummond, Coward, and Watson: Ibid., 1921, xv., 540. McCollum and Davis: Jour. Biol. Chem., 1915, xx., 641. McCollum and Davis: Ibid., 1915, xxi., 179. McCollum, Simmonds, and Parsons: Ibid., 1921, xlvii., 111. Osborne and Mendel: Ibid., 1917, xxxii., 309. Osborne and Mendel: Ibid., 1918, xxxiv., 17. Zilva and Drummond: THE LANCET, 1922, i., 1243. Zilva and Miura: Biochem. Jour., 1921, xv., 654.

WASSERMANN AND FLOCCULATION TESTS:

COMPARED IN 1000 CASES.

BY A. L. URQUHART, O.B.E., M.B., CH.B. EDIN., D.P.H.,

LECTURER IN PATHOLOGY AT ST. THOMAS'S HOSPITAL, LONDON.

SINCE the work of Sachs and Georgi[1] appeared on the phenomenon of the flocculation reaction (F.R.) test as evidence of syphilitic infection, many working on similar lines have endeavoured to find a procedure which will give by the simple flocculation method results as accurate as those obtained by the more complicated Wassermann reaction (W.R.). The results of the many investigators who have utilised this method, or modifications of it, are at variance. For while some claim for it greater reliability than the W.R., others find that the method gives unreliable results.

In the hands of certain workers results have been obtained which compare very favourably with those of the W.R. Dreyer and Ward[2] by their Sigma reaction tested over a thousand sera and found

"out of 386 cases of definite syphilitic infections the Wassermann reaction gave positive results in 327 cases, while the Σ reaction gave positive results in 381 cases. Thus the reaction gave positive results in 18 per cent. more cases than the Wassermann reaction. It only failed in five cases to reveal the presence of syphilis, while the Wassermann reaction failed in 59 cases."

Wang[3] in 200 cases tested, and Stokes and Whigham[4] in 1515 sera investigated found agreement in 96 per cent. of the tests. Perry and Lambkin,[5] following the method of Dreyer and Ward,[2] found agreement of 479 in 486 cases tested, seven cases giving discordant results. Collier[6] in 569 cases states that the Sigma test is more accurate than the W.R. In the following communication, in which 1000 sera have been tested, 98 per cent. of the results have been in agreement, 2 per cent. only giving divergent results.

Technique of the Flocculation Test.

The following technique has been adopted during these observations:—

1. The sera tested were obtained from syphilitic cases treated and untreated, suspected syphilitic cases, and from cases of diseases other than syphilis, including tuberculosis. All sera were taken with sterile precautions and inactivated at 58° C. for 20 minutes.
2. Alcoholic extracts of sheep's heart have been employed as antigens, to which cholesterol was added, and diluted with 0·85 per cent. sterile saline to 1–10.
3. The tubes and water-bath at 37° C. were those used for performing the W.R.
4. Dilutions of serum were made with a graduated 1 c.cm. delivery pipette in a watch-glass.
5. The readings were made after 24 and 48 hours' incubation at 37° C.
6. 1 c.cm. of diluted serum and 0·5 c.cm. of antigen were placed in each tube.
7. Readings were made against a dark ground with a + 6 hand lens.

To set up the test five tubes were taken. In a watch-glass 0·2 c.cm. of serum + 1·8 of 0·85 per cent. saline were mixed and 1 c.cm. of the 1–10 serum was placed in Tube 1. A further 1 c.cm. of saline was added to the contents of the watch-glass and 1 c.cm. of this 1–20 serum placed in Tube 2, and so on, Tube 5 containing 1 c.cm. of 1–160 serum. To each tube 0·5 c.cm. of antigen was added. The contents were mixed and the tubes placed in the water-bath at 37° C. for 24 hours. Control tubes of antigen and serum were also incubated.

Time of Reading the Reaction.

In the original Sachs-Georgi standard method readings were taken after two hours at 37° C., followed by 20 hours at room temperature, but in his later instructions of March 14th, 1922, Prof. Sachs recommends that the tube should be placed in the incubator at 37° C. over-night, and that readings should be taken on the following day. Readings are taken with the aid of a hand lens or with the agglutinoscope. Sachs states that in most cases reading is possible in three to four hours, but that the reading on the following day must not be omitted. Dreyer and Ward[2] recommend a period of seven hours' incubation in a water-bath at 37° C., followed by five to ten minutes' standing at room temperature.

With the antigen employed throughout this series, readings are noted at 24 and 48 hours, as it has been found that although in many cases positive readings could be obtained in seven hours when strongly positive sera were being investigated, yet in sera when the reading was recorded as + the reaction was not definite until after 24 hours' incubation, and in five instances only appeared during the second period of incubation. In these five cases the W.R.'s were also noted as weakly positive.

Method of Reading Flocculation Results.

The tubes at the end of 24 and 48 hours were removed from the water-bath, and readings taken with a + 6 lens against a small blackboard. The appearances were quite comparable to the degrees of agglutination present in typhoid agglutination, and all degrees of reaction occurred from complete sedimentation to a trace of flocculation. A + was noted against all tubes in which a reaction was observed, thus readings of from + to + + + + + were obtained, but the degree of flocculation might vary considerably in the sera which gave the reaction up to the same titre. Thus a serum which gave positive readings of "complete," "marked," and a "trace" of flocculation were noted as + + +, as would a serum reading "marked," "trace," "trace." Occasionally it was found that a zonular reading was obtained; thus Tube 2 might give a definitely heavier flocculation than Tube 1, and this phenomenon has been observed in readings of the reaction in other parts of the scale of dilution.

The readings of the flocculation test after 24 and 48 hours were usually similar in the number of tubes giving a reaction +, but the actual size of the floccules generally increased with the length of the incubation. It was, however, not uncommon to find that the titre to which the reaction had occurred in 48 hours was definitely higher than that which obtained at 24 hours, and it has already been noted that flocculation reactions in five instances only appeared after 48 hours' incubation.

The Wassermann Technique.

The W.R. of each of the sera was tested. For the hæmolytic system a 5 per cent. suspension of sheep's red cells sensitised with 6 minimum hæmolytic doses (M.H.D.) of hæmolytic immune body was used. In

order to ensure that the centrifugalised red cells were suitably packed, and to obtain a constant suspension with each batch of reactions, the final washing of the red cells was prolonged for 15 minutes. The supernatant saline was then removed, and the amount of hæmoglobin present in 5 c.mm. of the packed cells was estimated with a Haldane's hæmoglobinometer. It was found in practice that well-packed cells gave hæmoglobin contents of from 105–110 per cent., and only red cells which gave such readings were used to make up the suspension. In each tube were placed 0·25 c.cm. of inactivated serum diluted to 1–5, 0·25 c.cm. of cholesterolised sheep's heart antigen, and 3 M.H.D. of complement contained in 0·25 c.cm. After an hour at 37° C. 0·25 c.cm. of sensitised red cells was added, bringing the total volume to 1 c.cm., and the results were read after a further incubation of 1 hour. The usual control tubes were employed. Those sera which gave a positive reaction were titrated in three further dilutions of serum. Tubes containing 1–10, 1–20, and 1–40 dilutions of serum were set up, and readings of + to ++++ were thus obtained.

Preparation of Antigens for the Flocculation Test.

The antigens used in this investigation were alcoholic extracts of sheep's heart, to which definite quantities of 1 per cent. alcoholic solution of cholesterol were added, the mixture being diluted with 0·85 per cent. saline to 1–10. The sheep's heart extract was prepared by a modification of that of Bordet and Rulen's [7] method used by Dreyer and Ward [8] in the Sigma reaction. One hundred grammes of finely-minced fresh sheep's heart was sprinkled with alcohol and dried under hot-air fans. The dried heart muscle was ground to a fine powder in a mortar, and to 20 g. of the powder 200 c.cm. of acetone was added. The mixture was placed in the incubator at 20° C. and shaken at intervals for six days. The acetone was then filtered off and a further 100 c.cm. of acetone added to the residue and treated in a similar manner for a further 24 hours. The acetone was then filtered off and the residue allowed to dry at room temperature. To the resulting dry powder in a well-stoppered bottle, 200 c.cm. of 96 per cent. alcohol were added, and the mixture shaken for three hours; the bottle was then placed in the incubator at 37° C. for 18 hours, and then further shaken for two hours. The alcoholic extract was filtered off into a flask which was placed in an ice-salt freezing mixture for four hours. Much fatty material was brought out of solution by this cooling process, and by rapid filtration this material was eliminated and a golden-yellow heart extract obtained; further deposit of fatty material did not occur.

Method of Preparing Antigen for Use.

Logan [8] noted that the readings of the precipitin test were difficult when the antigen was opalescent, but that with more opaque antigens the readings were more easily noted. Several opacities of antigen, obtained by varying the dilution of the alcoholic extract, were tested, and it was found that using the antigens prepared by the above method in 1–10 dilution satisfactory and easily read flocculation resulted. A hand lens was employed to determine the end-point of the reaction.

Sachs in his instruction of March 14th, 1922, when diluting his antigen, prefers to mix them by the following method: "To 1 part of antigen add quickly 1 part of 0·85 per cent. saline and shake for half a minute. Add quickly a further 4 parts of saline. The dilution thus prepared is opalescent, but is homogeneous and translucent."

This method of preparation was tried, but did not always give a satisfactory homogeneous antigen. Dreyer and Ward [8] recommend dropping the saline on the alcoholic extract from a constant height at a constant rate, and it has been found that a homogeneous translucent antigen appears to be most readily obtained by dropping the saline on to the alcoholic extract. A 50 c.cm. burette was used for this purpose, and by dropping the saline on the extract from a height of 6 inches a satisfactory homogeneous antigen was obtained.

The Cholesterol Content of Sheep's Heart Extracts.

The first antigens used were mixed in the following proportion: 0·6 c.cm. of heart extract and 0·4 c.cm. of a 1 per cent. alcoholic solution of cholesterol were placed in a 6 by 1 test-tube and 9 c.cm. of sterile 0·85 per cent. saline were dropped on the alcoholic mixture. With this antigen flocculation occurred with syphilitic serum, but it was found that the titre of the serum tested varied considerably with antigens prepared from other sheep's hearts and made up by the same formula. Each heart extract was then tested on several positive sera, using different proportions of extract and cholesterol, the total alcoholic content remaining unchanged (1–10). It was found that an optimum addition of cholesterol could be made, by which the highest and most clear-cut readings were obtained. This proportion of extract to cholesterol varied in the different antigens. Thus five antigens were made from extract No. 2 containing varying proportions of extract and cholesterol. All were made up to 1–10 with saline. Each of the five antigens were tested against several syphilitic sera, and the antigen which gave the highest and most clear-cut readings was noted. The amount of cholesterol added to this particular antigen was considered the optimum for the heart extract.

In Table I. the figures for extract No. 2 with the readings at 48 hours are tabulated.

TABLE I.

Extract No. 2 tested on a syphilitic serum. Five antigens prepared, containing varying proportions of extract and cholesterol in 1–10 dilution.

Heart ext. (c.cm.).	1% cholesterol (c.cm.).	Dilutions of serum.				
		1–10	1–20	1–40	1–80	1–160
0·6	0·4	IC	M	Tr.	Tr.	–
0·7	0·3	IC	IC	M	Tr.	–
0·8	0·2	IC	IC	IC	M	Tr.
0·9	0·1	C	C	IC	IC	M
1·0	Nil	C	IC	M	Tr.	–

C, Complete. IC, Incomplete. M, Marked. Tr., Trace. –, No reaction.

The reactions occurring with this serum show that those obtained by using this heart extract in the proportions of 0·9 c.cm. of extract, 0·1 of cholesterol in 9 c.cm. of saline gave the most powerful and clear-cut results. Both above and below that concentration the reaction was definitely weaker. In conjunction with results obtained from other sera also this No. 2 extract was found to give the best results when used in the above-mentioned proportions.

Similarly, the five remaining antigens were tested and it was found that the optimum addition of 1 per cent. cholesterol for these extracts varied to considerable extent. In Table II. are noted the optimum dilutions for the six antigens prepared and employed in testing 1000 sera.

TABLE II.

Antigen.	Heart ext. (c.cm.).	1% cholesterol (c.cm.).	Saline 0·85% (c.cm.).
1	0·6	0·4	9
2	0·9	0·1	,,
3	0·8	0·2	,,
4	0·8	0·2	,,
5	0·7	0·3	,,
6	0·7	0·3	,,

When the heart extracts were tested on syphilitic sera, after the optimum cholesterol addition had been made, the readings obtained by the flocculation test were of similar titre, and thus comparative results could be obtained with any of these antigens. These antigens are still in use and are giving satisfactory results, some of them being more than a year old. It would appear, therefore, that either the amount of

cholesterol present in sheep's heart muscle varies with different animals, or the amount extracted from the muscle by acetone and alcohol varies. By adjusting the amount of 1 per cent. alcoholic solution of cholesterol to a suitable proportion closely approximating readings may be obtained with any heart extract made by this method, but without this preliminary experimentation to find the optimum cholesterol addition, no comparative readings of the flocculation test can be made.

Granularity in the Flocculation Test.

In a certain number of flocculation tests in which negative W.R.'s were recorded a slight granularity of the antigen was noted after incubation. This granularity was not observable by the naked eye, but showed when the tube was examined by the hand lens. In these tubes definite flocculation had not occurred, but when the control tube and the test tube were examined side by side the granularity was quite apparent. Similarly, when negative sera were examined in dilutions lower than 1–10 this granularity frequently appeared. In reading the tests, therefore, tubes showing this granular condition must be regarded as negative or "false positive" readings will be recorded. There is, however, little difficulty in distinguishing this granular condition from flocculation. This appearance in the tubes rarely occurred in dilutions of 1–10 or over. It was also noted in some of the antigen preparations containing more than the optimum amount of cholesterol, that shimmering crystals appeared during or even before incubation. These crystals at first gave the appearance of flocculation in the tubes, but were easily distinguished from true flocculation by the hand lens. In no case was this crystalline deposit observed when the antigen was made up containing the optimum or less than the optimum amount of cholesterol.

The Comparative Results of the Flocculation and Wassermann Reaction Tests.

Of the 1000 sera tested the following analysis may be given:—

TABLE III.

Analysis of 1000 sera compared by the Wassermann and flocculation tests.

Fl. + W.R. +	Fl. − W.R. −	Fl. − W.R. +	Fl. + W.R. −	Percentage of divergent results.
221	759	10	10	2% = 20 cases.

The sera investigated were obtained from various sources: (*a*) From persons suffering from untreated syphilitic infection; (*b*) from persons suffering from syphilitic infections who were under treatment; (*c*) from persons suffering from suspected syphilitic infections; and (*d*) from persons suffering from acute and chronic diseases in which syphilitic infection was not present.

The (*d*) group of cases formed the majority of the sera tested, as it is important to ascertain whether non-syphilitic conditions, acute or chronic, will give "false positive" results with the flocculation test. It would appear, however, that such is not the case. Of the 1000 sera tested by the W.R. 231 gave a positive reaction and 769 negative. The same sera tested by the flocculation test differed in 20 instances, or 2 per cent. Of these 20 cases, 10 gave a negative flocculation test when a positive W.R. was noted, and in 10 cases where a positive flocculation was recorded the W.R. was negative.

The titre to which the sera of untreated cases of syphilis reacted by either method of testing corresponded to a marked degree, weak positive W.R.'s corresponding to weak positive flocculation reactions, and strongly positive ones to strongly positive. This similarity in titre can hardly be more than commented upon, in view of the dissimilarity of the two tests—complement fixation on the one hand, and a precipitin reaction on the other: but it is of interest to note that these results have been obtained in the sera of syphilitic persons who have not received treatment, and that this agreement between the two methods of examination has held throughout the series.

In Tables IV. and V. the details of the cases giving divergent results by the two methods of testing are noted with the clinical diagnosis.

TABLE IV.

Cases in which positive W.R.'s but negative F.R.'s were present.

No.	Diagnosis.	W.R.	F.R.	No.	Diagnosis.	W.R.	F.R.
1	Child. Congen. syphilis	+ + +	−	7	Tertiary syphilis	+	−
2		+	−	8		+	−
3		+	−	9	Brachial neuritis	+ + +	−
4	Tabes	+	−				
5	Primary syphilis	+ +	−	10	Hæmorrhoids	+ +	−
6		+	−				

− = No reaction. + = Positive reaction.

TABLE V.

Cases showing negative W.R. but positive F.R.

No.	Diagnosis.	W.R.	F.R.
1	Child, congenital syphilis	−	+
2		−	+
3		−	+
4		−	+ +
5	History of stillbirths	−	+ + +
6	Aortic regurgitation	−	+
7	Intracranial tumour	−	+
8	Primary syphilis	−	+
9	Interstitial keratitis	−	+
10	Jaundice (hæmolysis)*	−	+ +

* In case No. 10 of this list a very considerable degree of hæmolysis occurred after the serum had been in contact with the clot for some time and the positive reaction was probably due to presence of the hæmoglobin in the blood serum.

In each of these Tables IV. and V. it is seen that although in the majority of these exceptions in which divergent reactions were recorded the positive reaction was present only as a + reaction, yet cases occur in either list of sera giving a ++ or +++ reaction by one method and failing to give any reaction by the alternative test.

Result of Treatment on Comparative Results of the W.R. and F.R. Tests.

In cases of syphilitic infection which had received treatment the correspondence in titre which was found in the untreated cases did not hold. The F.R. test readings frequently were one + or more stronger than those of the W.R. Thus in 50 cases of syphilitic infection in which treatment had been given, 19 only showed correspondence in titre, while in 31 the F.R. test gave considerably stronger readings than the W.R. In no case under treatment did the W.R. reading exceed that of the F.R. test. In only a few instances has the same patient been examined on more than one occasion, and few consecutive tests on individuals under treatment have been made. These findings, therefore, would suggest that the F.R. does not disappear from the sera in cases of syphilitic infection so rapidly as the W.R.

The Flocculation Test in Cases of Tuberculosis.

The sera of 18 cases of tuberculosis were tested in which the tubercle bacillus was demonstrated in the sputum. In 17 cases negative reactions were recorded by both the W.R. and F.R., while in one case both the W.R. and F.R. were noted as +, but further information as to a history of syphilitic infection was unobtainable.

The Presence of Hæmoglobin in the Blood Serum.

Fifty-one of the sera tested showed definite degrees of hæmolysis. In 12 of these cases a positive W.R. and F.R. occurred. In the remaining 39 sera the W.R. was negative, and 32 of these gave negative F.R. tests; of the remaining 7 cases 5 presented a floccular appearance in the tubes, and in 2 a very definite reaction occurred, the amount of colouration

in the serum in these last 2 cases was considerable. It would appear, therefore, that negative results where hæmoglobin is present in the serum are reliable, but positive readings are not to be relied upon as "false positive" readings may be recorded.

Contamination of Serum Used in the Flocculation Test.

The blood for the F.R. test was usually obtained by venepuncture and was taken with the usual sterile precautions. In a certain number of cases, however, contamination had occurred, and it was found that during the long incubation at 37° C. the organisms grew and gave the appearance of flocculation in the tubes. In cases where the growth was massive the error was easily detected, but where less luxuriant growth was encountered the true reading of the results was much more difficult. Such results from contaminated sera have not been included in the series. It is of importance that the sera tested should be sterile, as "false positive" readings will otherwise be recorded. The serum control in the test will give evidence of such contamination. Dreyer and Ward[2] note that if a serum obviously infected gives a negative reaction the reaction may be accepted as valid, but all positive reactions in infected sera must be discarded and further specimens examined.

The Presence of Bile Pigment in the Serum.

Eight of the sera tested contained bile pigment. Of these three gave positive reactions by both tests, and the remaining five negative reactions. It would appear, therefore, that the presence of bile pigment in the serum does not interfere with the F.R. In one case noted in Table V., in which bile pigment was present, a positive F.R. was noted, but a considerable degree of hæmolysis had also occurred which was probably responsible for this result.

Anticomplementary Serum.

Five anticomplementary sera were tested during the course of these observations. In each of them the true reading of the W.R. was negative, as was the F.R. The anticomplementary state of blood serum does not appear to affect the F.R. test.

From these observations it would appear that using antigens prepared by the above method the F.R. test yields satisfactory evidence of syphilitic infection; and there is a large mass of evidence in the work of others to show that the original Sachs-Georgi test, or Sigma test, or modifications of these methods are capable of giving results as satisfactory as those of the more complicated W.R. In the above series of 1000 tests a lack of agreement between the findings of the two methods occurred in only 2 per cent. of the cases.

Conclusions.

1. That the flocculation test gives as reliable results as the Wassermann reaction.

2. That the flocculation test is preferable to the Wassermann reaction on account of its greater simplicity.

3. That sheep's heart extracts make satisfactory antigens, and that similarity of antigenic property may be obtained by adjustment of the amount of cholesterol added to the heart extract.

4. That contamination or hæmolysis in the sera may give rise to false positive readings and such sera should not be used in the test.

5. That the presence of bile pigment, or an anticomplementary state of the serum does not interfere with the flocculation test.

References.—1. Sachs, H., and Georgi, W.: Med. Klin., 1918, xiv., 805. 2. Dreyer, G., and Ward, H. K.: A Simple Quantitative Serum—Reaction for the Diagnosis of Syphilis, THE LANCET, 1921, i., 956. 3. Wang, C. Y.: A Precipitation Test for Syphilis, THE LANCET, 1922, i., 274. 4. Stokes, A., and Whigham, J. T.: A Comparison of the Wassermann and Sigma Reactions in 1500 Tests, Journal of Path. and Bact., July, 1922, vol. xxv., No. 3. 5. Perry, H. Marrian, and Lambkin, E. C.: R.A.M.C. Journal, June, 1922, p. 440. 6. Collier, W. T.: Wassermann and Sigma Tests, THE LANCET, 1922, ii., 274. 7. Bordet, J., and Ruelens, G.: L'Antigène Syphilitique de l'Institut Pasteur Bruxelles, Comptes Rendus de la Société de Biologie, t. lxxxii., Feb. 2nd, 1919. 8. Logan, W. R.: Experiments with the Flocculation Test for Syphilis, THE LANCET, 1921, i., 14.

SYPHILIS TRANSMITTED TO THE THIRD GENERATION.

BY C. F. T. EAST, B.M., B.CH. OXF., M.R.C.P. LOND.

IN the seventeenth century van Helmont[3] thought that syphilis might be transmitted to the third generation. Sanchez[5] expressed the same view in the eighteenth century. On the continent of late years the idea has found much support. Barthelémy[1] was in favour of it being possible. Fournier[2] has urged strongly that the transmission of congenital syphilis undoubtedly does occur, and has collected a number of cases. In Germany Schultz[6] has supported this view. Sir Jonathan Hutchinson,[4] however, did not agree with this, and Dr. G. F. Still[7] considers the question undecided. The case about to be described would appear strongly to support the evidence that congenital syphilis can be transmitted to the second generation. It is therefore thought worthy of record.

A young woman, aged 23, was brought to hospital complaining of inflammation of the eyes. She had very typical interstitial keratitis, which she said had begun about six weeks previously. The right eye was more affected than the left. There was a history of eye trouble of a similar nature when she was 8 years old; this had subsided under treatment. Her mother said that she had been perfectly healthy as a baby; apart from the usual childish ailments, the keratitis was her only illness.

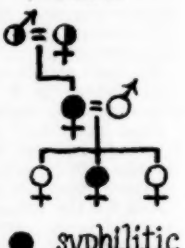
Condition on Examination.—There were traces of pigment on the anterior surface of the lens capsule in the left eye; otherwise the media, choroid, and retina of each eye were normal. There were no changes in the bones showing congenital syphilis and no scars at the angles of the mouth. The hearing was good. The condition of the teeth is best shown by the accompanying diagram (Fig. 1.) She seemed a

FIG. 1.

normal, well-grown, healthy young woman. The Wassermann reaction (W.R.) in her blood was strongly positive.

Family History.—Her two sisters, 28 and 17 years old, were also examined. Neither of them had any trace of congenital syphilitic lesions; in both W.R. was negative. Their father said that he had never had any venereal disease and he showed no trace of any syphilitic lesion; nor was there anything in his history to suggest that he had ever had syphilis. His W.R. was negative. The patient's mother said that she had never had a miscarriage. It was noticed that the cornea of the mother's left eye had unmistakably the scars of an old interstitial keratitis. She had an external strabismus in this eye. In other respects her eyes were normal. Her teeth were typically Hutchinsonian. The arch of the palate was high; there were no scars at the mouth-angles; the bridge of the nose was normal. The bones of the skull and the tibiæ showed no abnormality. She said that when 6 years old she had had eye trouble. She had had treatment for this, and it had got better. The trouble had recurred about the time of the birth of the patient, when her eyes had been acutely inflamed. The W.R. in her blood was strongly positive. She said that she had always been well, and looked a strong, healthy woman. She was an only child, her father had been a soldier on foreign service, dying of "senile decay" at the age of 71. Her mother had died many years ago. As far as she knew there had been no miscarriages. The history of the family is tabulated in Fig. 2.

FIG. 2.



As far as a negative can be proved I think we may reasonably exclude the father of the patient as a factor. It would seem, then, that we have here as clear a case as possible of a woman suffering from congenital syphilis and passing on the disease to her daughter. One may suspect that the soldier grandfather, who had seen much foreign service, originally introduced

the syphilitic infection into the family. It seems an interesting point to notice that the lesions in the daughter reproduce so faithfully those found in the mother. It may be noted also that the eldest and youngest daughters escaped the infection apparently; while the second child, to whom the disease seems to have been transmitted, was born about the time that the mother had what was evidently a recurrence of her interstitial keratitis.

References.—1. Barthelémy: Annales de Dermatologie et Syphilis, October, 1897. 2. Fournier: Heredosyphilis de la seconde generation, Paris, 1905; Heredosyphilis tardive, Paris, 1907, p. 17. 3. van Helmont: Tumulus Pestis, Frankfurt, 1707. 4. Hutchinson, Sir J.: Congenital Syphilis, System of Medicine, vol. ii., Allbutt and Rolleston. 5. Sanchez: Observations sur les maladies vénériennes, Paris, 1785. 6. Schultz: Haut und Geschlechtskrankheiten, Leipzig, 1913. 7. Still, G. F.: System of Syphilis, vol. i.: Congenital Syphilis, London, 1908.

A TECHNIQUE OF SPINAL ANALGESIA FOR LAPAROTOMY

BY S. A. LANE, M.D. DUB.,
SURGEON, BOGNOR WAR MEMORIAL HOSPITAL.

THE purpose of this paper is to describe a technique of spinal analgesia for laparotomy whereby the patient undergoes operation, returns to bed and "comes to," unaware that operation has taken place. Granting this objective, it may fairly be claimed that the advantages incident to spinal analgesia will have been attained and the objections usually urged against the method eliminated. The first two of my patients to undergo operation in the above manner were both women aged 64; the one had a twisted ovarian cyst and the other a strangulated hernia; both patients were entirely unaware of having undergone operation, and the second patient remained incredulous until the following morning when a silkworm gut drain was removed.

I here describe an endeavour, made during the past year, to achieve this end in every case. The favourable results obtained have encouraged me to write this paper. The details of technique are sufficiently important to make a full account desirable. The surgeon and theatre staff should constitute a team well acquainted and thoroughly conversant with all details; failing this, the results are likely to be mortifying. The scope of analgesia includes all abdominal procedures.

Procedure before Operation.

The hour of operation is withheld from the patient unless he especially asks to know this. Three-quarters of an hour before operation any manipulations likely to disturb (e.g., passing a catheter) are attended to. The patient is settled comfortably on the trolley which takes him to the theatre, and is, if possible, placed in a quiet room. A hypodermic injection is given containing hyoscine 1/100, morphine 1/6, and atropine 1/150 (B. W. & Co.'s Hyoscine Compound A), the ears plugged with wool soaked in olive oil, and the disturbing influence of light and sound excluded as far as possible. Ten minutes before operation the condition is observed; if asleep or very drowsy, well and good. If not, a further hypodermic injection is given of hyoscine 1/450. Smoked glasses or goggles are put on before the patient is wheeled into the bright light of the theatre. The surgeon is washed up and ready as the trolley enters. The patient is made to sit up, and is drawn forward by a nurse standing at the foot of the table. It is an advantage to lower slightly the foot end of the table, whilst it is important that the patient be not too far down the table, as this produces involuntary hollowing of the back.

On withdrawal of the needle the puncture is quickly covered with collodion gauze and the patient lowered into the Trendelenburg position, to the extent of 30° with the least possible delay. The surgeon can then proceed to wash up again, whilst with a pin the "anæsthetist" tests the level of analgesia, watching the patient's face, but never speaking until analgesia reaches the lower costal margin. The table is then brought level unless a Trendelenburg position is required. The "anæsthetist" tests to see if analgesia goes to the nipple level, and if this happens the table is put level. The patient's wrists are now quietly tied in such a way as to prevent his having a hand in the operation.

Sleep usually comes quickly after the spinal injection. If not, the smell of ether on a mask, if thought desirable, is soon followed by sleep, and the eyes are covered. Conversation and noise are restricted as far as reasonably convenient, the impulses therefrom not being "blocked" save for the ear-plugs.

Indications for General Anæsthesia.

Should any indication for a "general anæsthetic" arise it is given at once. Shipway's warm vapour apparatus was found very good, it being always easy to get the patient quickly "under" with so small a quantity of ether that few, if any, of the unpleasant after-effects were produced. The indications for "general anæsthesia" noticed were in this order: (1) straining, if it embarrassed the operator; (2) returning sensation; and (3) returning consciousness. The patient ought never to realise operation is going on for want of a little ether.

Remarks.

The effect of the above procedures is to mitigate to a considerable extent pre-operative anxiety and so to bemuse the faculties that the patient goes to the operation oblivious of his surroundings and proceedings, acquiring a complete "nerve block" of the operation field, and maintaining unconsciousness throughout by the avoidance of disturbing stimuli, and, when necessary, by recourse to general anæsthesia in the small amount found adequate.

The great immunity from complication and accident in cases treated on these lines shows the method to be extremely safe. There was no case of collapse among any of the laparotomies, and only one in a series of about 70 spinal anæsthetics. This occurred in an ex-soldier during an amputation of a toe, and occasioned only a short delay. There has been a complete absence of "stovaine headache." In marked contrast to this is the experience of the writer when at a casualty clearing station in France, where, in a series of over 400 spinals, severe headache was rather the rule and collapse of varying degree not infrequent. The ordeal of operation was, undoubtedly, much less formidable than with general anæsthesia. A member of the theatre staff, who underwent subtotal hysterectomy, asked for "spinal," and later stated she did not regret having done so.

In addition to what has been said, the following points deserve emphasis: 1. Absence of risks and results peculiar to general anæsthesia, and apparently so even though recourse be had to it later. 2. Absence of post anæsthetic vomiting. 3. In critical cases no need for undue haste to "save the anæsthetic." One can count on 45 minutes anyway. The patient gains by an efficient operation rather than suffers from a prolonged one. 4. Increased ability to undergo prolonged operation and a much improved prognosis in many critical conditions. 5. Ability to take water or glucose solutions by mouth after operation instead of rectal saline.

The following were cases unaware of operation after returning to bed, and in whom no vomiting occurred after operation: (*a*) gastro-jejunostomy and appendicectomy; (*b*) subtotal hysterectomy; (*c*) intraperitoneal shortening of round ligaments and appendicectomy; (*d*) short circuit for irremovable carcinoma of splenic flexure; (*e*) hernia, during which the presence of large vesical calculus was verified; the same patient a fortnight later underwent suprapubic cystotomy for removal of calculus.

The preparatory doses of hyoscine have not exceeded two in number so far, and hyoscine was not used for patients under 16 years of age. The spinal solution used is stovaine and glucose 5 per cent. (Allen and Hanburys), and a 2 c.cm. dose was employed for adults.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF THERAPEUTICS AND PHARMACOLOGY.

THE PRESENT POSITION OF ORGANOTHERAPY.

A MEETING of this section of the Royal Society of Medicine was held on Jan. 9th, Dr. LANGDON BROWN, the President, being in the chair, when Prof. SWALE VINCENT opened a discussion on this subject.

The Physiological Aspect.

He said that it was sometimes maintained that in therapeutics, as in other matters, only those methods which were found useful and beneficial would ultimately survive. In the employment of various substances to relieve pain, however, or to restore to the normal the deranged machinery of life, it would seem that we cannot even yet trust either the scientific discrimination of medical men or the commonsense of the general public to eliminate the useless and to hold fast to that which is good. At the present time many physicians, said Prof. Vincent, are habitually prescribing preparations derived from the various ductless glands, from digestive glands, reproductive organs, prostate, mammary glands, and less frequently from nervous, muscular, and other tissues. The belief in the efficacy of all these substances was based on a widely current view that all organs and tissues manufactured and poured into the circulation substances whose function it is to regulate the activities of different parts of the nervous system and to influence the general metabolic activities of the animal economy. The untenable hypothesis that the secretion of the chromaffin tissue maintains, or helps to maintain, the tone of the blood-vessels, and the normal blood pressure has given rise, for example, to the whole fabric of vagotonia and sympatheticotonia. When it became clear that physiological experiments lent no support to these views, a large number of physicians defended the use of organic extracts on the grounds that though they may contain no physiologically active principle, they are found useful empirically. This attitude was difficult to criticise on a priori grounds, because some few cases might be adduced where the value of a drug had been discovered by purely empirical means; but in the majority of these cases it had been possible at a later date to correlate the observed therapeutic value with a definite pharmaco-dynamic action subsequently discovered. It would be difficult to mention a drug of proved value in the treatment of disease which possessed no known pharmaco-dynamic effects. In organotherapeutics a large number of substances were commonly recommended for administration by the mouth, which as far as could be ascertained by careful experiment produced no physiological effects when given in this way. When such extracts were administered subcutaneously or intravenously, however, into dogs or cats mild transient stimulant or irritant action was produced. Intravenous injection of tissue extracts might produce lowering of the blood pressure and certain other changes. These effects, however, were not specific. No serious attempt had been made to correlate these physiological actions with any kind of therapeutic action, the extracts given medicinally being recommended for reasons quite independent of their physiological action. In addition to the acknowledged value of the thyroid and the posterior lobe of the pituitary, there might be a few instances where feeding with an organ for a prolonged period might produce some effect upon the rate of growth in young animals, or even upon the growth of special organs or tissues. Thus adrenal substance (cortex) when administered to a young growing animal seemed to induce a growth of the testis greater than in the control animals. Prof. Vincent did not, however, believe that there were many such instances. The difficulty of estimating the effect of treatment was not confined to organotherapy. In any branch of therapeutics it was difficult to decide whether the recovery of a patient was due to the treatment or whether it occurred in spite of the treatment.

Prof. Vincent proceeded to consider the therapeutic value of extracts from various gland substances.

Thyroid Medication.—Prof. G. R. Murray had discovered in 1891 that the administration of thyroid substance cured myxœdema, and up to the present time thyroid material had proved to be one of the most satisfactory drugs at our disposal. Thyroid extract, and its active principle, thyroxin, brought about an increase of the total metabolism of the body, the effect being most marked where there was a deficiency of thyroid secretion. Prof. Vincent laid stress on the value of thyroid preparations in myxœdema, cretinism, and in lesser degrees of hypothyroidism; in some cases of goitre thyroid was useful, but iodides were more efficient in the hands of many physicians. In obesity thyroid medication had been found useful when carefully applied. It was conceivable that in so far as this extract stimulated the chemical activities of the body it might be of value in a variety of conditions, and if there were any good to be obtained from the so-called polyglandular preparations this was probably attributable to the thyroid substances contained in them.

Parathyroid Medication.—In tetany some good results had been reported, oral administration being less beneficial than implantation. There was no satisfactory evidence that any form of tetany, except that following operations upon the thyroid and parathyroids, was due to a lesion of the last-named bodies. It seemed certain that tetany was a name applied to a condition which might arise from a great variety of causes.

Pituitary Medication.—It had never been shown that treatment by pituitary extracts had the slightest effect in remedying the symptoms thought to be due to pituitary insufficiency. Recent work suggested that many, if not all, of the symptoms formerly attributed to lesions of this organ were in reality the effects of injury to the hypo-thalamus. Posterior lobe preparations had been found useful in the treatment of polyuria, to aid uterine contractions, and to stimulate smooth muscle fibre elsewhere, as in the intestine. These uses of posterior lobe preparations had, however, no bearing on the functions of the organ; they were not instances of a substitution therapy.

Adrenal Medication.—The well-known value of adrenalin bore a very problematic relation to the function or functions of the adrenal body as a whole, or to the services possibly rendered to the animal economy by the chromaffin tissues. Here again it was not a question of substitution therapy. In Addison's disease adrenal preparations did not seem to be of the slightest value. Adrenalin produced no effects when given by the mouth, unless it were on the lining membrane of the stomach.

Testicular and Ovarian Medication.—It was doubtful whether these extracts produced the slightest effect when administered by the mouth. As to the testis, Prof. Vincent referred to the methods of Steinach and of Voronoff, stating that it was too early to appraise the value of these rival claims, or to express a positive opinion as to the results which might be expected to follow either of the methods. With reference to grafting, he pointed out that unless blood-vessel suture was employed, grafting was at best a temporary expedient.

Pancreatic Medication.—Hitherto the administration of pancreatic extracts had not proved of any value in the treatment of diabetes; but though it was not wise to be too sanguine, a step in advance had undoubtedly been made by the Toronto workers in the production of insulin. Dr. Mackenzie Wallis claimed to have prepared a pancreatic extract which was effective when given by the mouth. Prof. Vincent

summed up the position of organotherapy in the following words:—

"If we seek for cases where it is possible to apply a true substitution therapy and artificially to replace the internal secretion of a gland, we have no clear instance except the solitary one of the thyroid. It may be that we shall before long be enabled to include the pancreas in the category. There are, however, some few instances where extracts of organs, or purified chemical substances obtained from them, are valuable as drugs, apart altogether from the question of internal secretion. Such are adrenin and extracts from the posterior lobe of the pituitary body. Of the rest of the gland and tissue extracts and preparations it might perhaps be well to say nothing, if it were not that their exploitation on the present-day scale may constitute a formidable kind of quackery. There is no subject upon which so much utter nonsense has been talked as upon internal secretion, and organotherapy, or at any rate a large part of it, may be defined as the application of this nonsense to practical medicine. In the meantime, certain forms of manufacturing druggists are making the most of a unique opportunity, and are growing rich by reason of the inadequate education of medical practitioners and the notorious ignorance of the general public on all matters relating to their own bodies."

The Therapeutic Aspect.

Prof. G. R. MURRAY said that certain lines of treatment by organotherapy were based on sound physiological principles and had proved of great value. Unfortunately owing to the enthusiasm of some speculative writers a great deal of ephemeral literature had appeared, much of which was of no value, and some of which had been positively harmful. The term organotherapy should be confined to the employment of the products of the excretory, secretory, and incretory glands in the treatment of disease. Other tissues should be regarded as foods rather than drugs. The excretory glands did not promise much help in this direction. Urea had well-known uses in medicine, and was a substance which, though not produced by the kidney, was excreted by it. Pepsin and pancreatin were principles of the secretory glands; their value was well known. Prof. Murray proposed to confine his remarks to the conditions in which treatment by incretory or endocrine glands was of proved value.

Thyroid Gland.—This gland contained at least one active hormone—thyroxin—of which the composition was known. Fortunately thyroid hormones could be absorbed unaltered in activity from the alimentary canal. The most important use of these preparations was to supplement a failing thyroid gland. In cases of the lesser degree of hypo-thyroidism, as indicated by mild cretinism in the child and slight myxœdema in the adult, doses of ℥v. of liquor thyroidei, or gr. ii. or gr. iii. of dry thyroid extract daily would be followed by steady improvement. In the later stages of thyroidal atrophy larger doses produced equally successful results, provided no incurable degenerative change in any other organ was developed. There was a latent period of a week or more before any definite effect could be observed. Kendall had shown that after a single injection of thyroxin in a case of myxœdema there was a latent period with a slow increase of reaction which reached a maximum at about the tenth day and persisted from five to seven weeks. Boothby had calculated that in order to maintain the normal basal metabolic rate 12 to 14 mg. active thyroxin must be present in the body, and that the thyroxin is used up at the rate of about 0·5 mg. a day. In order to maintain a normal basal metabolic rate in a fully developed case of myxœdema, it would require a daily intravenous injection of this amount of thyroxin. A larger amount would be necessary when given by the mouth. Plummer and Boothby estimated this at about 1·5 mg. daily. From clinical observations of cases over several years, Prof. Murray estimated the equivalent amount of liquor thyroidei (B.P. 1898) to be ℥x. or gr. v. of fresh gland, as this was a sufficient daily dose to maintain health after complete atrophy of the thyroid gland. In the treatment of simple parenchymatous goitre without symptoms of hyperthyroidism, a daily dose of gr. ii. of thyroid was often very useful. Since the thyroidal hormone was a powerful stimulator of metabolism, its use was beneficial in certain diseases of the skin, for example, psoriasis, and in the treatment of chilblains. In simple obesity thyroid was seldom beneficial unless combined with a suitable diet, and in any case must be used with caution. In some menstrual disorders and in nocturnal enuresis quite small doses had been found useful by various observers. The good results described in tertiary syphilis were due probably in part to the iodine contained in thyroxin and in part to the stimulation of metabolism. The thyroid hormones were evidently stimulators of intestinal peristalsis, and relieved some forms of constipation.

Parathyroid Glands.—There seemed to be good reason for the view that these glands neutralised or prevented the formation of guanidine, excess of which was probably a cause of tetany. According to Dr. H. Vines these glands were also concerned with the regulation of calcium metabolism.

Suprarenal Glands.—It was known that Addison's disease was due to a destructive lesion of the suprarenal glands. It was also known that adrenalin could be extracted from the medulla of these glands, but there was a large gap in our knowledge between these two observations. Prof. Murray had never seen permanent improvement take place in a case of Addison's disease following on the administration of any preparation of the adrenal gland. It was probable that in the few recorded recoveries the symptoms had been due to the loss of one suprarenal gland, and recovery to the development of a compensatory hypertrophy of the other. The right way of supplementing adrenal deficiency had not yet been found. Adrenalin, however, was a well-known remedy in the treatment of shock, in the treatment of asthma and œsophageal spasm, and locally in arresting hæmorrhage.

Pituitary Gland.—What had been said of the suprarenal gland applied largely to the pituitary gland; assuming that adiposo-genital dystrophy was due to the loss of pituitary hormones, we were unable to remove the signs of this disorder by giving glandular preparations. The value of posterior pituitary extract as a uterine stimulant in paralytic distension of the bowel and as a temporary cardiac stimulant in acute disease was recognised.

Gonads.—There was little satisfactory evidence to show that either testicular or ovarian preparations had any therapeutic action when injected or taken by the mouth. The reported relief of subjective sensations was not sufficient evidence. A true test, for example, would be success in making the eunuch grow a normal amount of hair on the face.

Prof. Murray said that the discovery of a method of making an efficient extract of the islands of Langerhans suggested that further researches might yield new and useful therapeutic agents from the endocrine glands, and teach us how best to employ those already in our possession. He concluded: "In summarising the present position of organotherapy we may certainly claim that in preparations of the thyroid, parathyroid, pancreas, suprarenal, and pituitary glands, we possess agents of proved value. In the case of other endocrine glands, while recognising the importance of their functions, we cannot fairly claim that we as yet know how to obtain or employ active preparations made from them. To those of us who have devoted attention to endocrinology for many years, the recent exploitation of organotherapy for all kinds of diseases is deplorable, as it is apt to discredit a valuable means of treatment when properly employed."

Dr. W. R. GROVE described cases of long-standing varicose ulcers in patients showing deficiency of calcium in the blood as estimated by Dr. Vines. These ulcers had improved greatly under intramuscular

injections of calcium. In some cases the calcium content of the blood could not be raised to normal. To these parathyroid gland was given in 1/10 gr. dose daily; the blood rapidly became normal in calcium content and the ulcers healed completely. They concluded that parathyroid extract was capable of influencing calcium metabolism, and that with normal calcium content of the blood healing speedily occurred. Cases which did not progress were found to have a primary septic focus, such as pyorrhœa, and when this was removed they improved greatly. Dr. Grove quoted a large number of cases of gastric and duodenal ulcer, phlebitis, diseases of the rheumatic group, and many other diseases of septic origin in patients whose blood was deficient in calcium; these, he believed, had improved greatly under parathyroid therapy. He concluded that parathyroids had a definite remedial action in all the chronic diseases accompanied by a calcium deficiency, which is simultaneously improved or brought to normal. He regarded parathyroid extract as a physiological aid to the healing of chronic lesions due to toxic absorption. If the focus of the toxin were removed parathyroid would then—and then only—bring about a cure, and was a valuable remedial agent.

Dr. H. VINES said that in all the various diseases improved by parathyroid therapy the underlying condition was sepsis. In some cases where the white blood count had been low, the full polymorph count rose to 18,000 in two or three weeks. In many cases increased purulent discharge followed parathyroid therapy. He believed the action to be a stimulation of leucocytes, probably indirectly through the action of calcium on blood plasma. Broadly speaking, he believed that the use of parathyroids increased physical resistance to bacterial disease.

The PRESIDENT called on Prof. W. E. DIXON to describe recent experimental evidence of the action of ovarian extract.

Prof. Dixon said that Harvey Cushing had observed that pituitary extract was secreted into the cerebro-spinal fluid. In order to determine whether pituitary secretion was present in the cerebro-spinal fluid, Prof. Dixon had put a cannula into the spinal canal in dogs and cats and had tested the fluid by its action on uterine muscle. He succeeded in finding pituitary extract present in nearly every specimen, though different samples contained different amounts. In attempting to ascertain what substance or substances could increase the pituitary secretion, he found that the one substance which invariably produced an immediate increase in pituitary secretion was ovarian extract boiled, filtered, and injected into a vein. The active substance was not present in the corpus luteum, nor was orchitic extract efficacious. This stimulating action of ovarian extract appeared to offer an explanation of the normal action of the pituitary body on uterine muscle. It did not explain the intestinal action of pituitary extract. However, it was found that extracts of duodenum also produced increased pituitary secretion, though not immediately. The increase was smaller and more prolonged. Prof. Dixon suggested that the action might have something to do with facilitating absorption in the alimentary canal. Pituitary extract increased the tone of the whole of the small intestine, and wide relaxation of the large intestine was associated with this, the reason being unknown.

The PRESIDENT said that the cold douche of scepticism with which Prof. Vincent had opened the proceedings was refreshing. It was only fair to say that organotherapy was a good deal behind endocrinology. The value of clinical observations was very difficult to assess, but the methods described by Drs. Vines and Grove appeared to indicate one way of making progress. Prof. Dixon's researches had shown that ovarian extracts had some action. It was hardly fair to say that the pharmacological effects of pituitary extract had nothing to do with the effect of the whole gland. The President quoted two cases in which ovarian extracts had appeared to be of some use.

Reply.

Prof. VINCENT commented on the fact that throughout the discussion the only extracts claimed as having therapeutic efficacy in which no pharmacological action was discoverable were the parathyroids. He could see no reason why any agent should have a pharmacological effect if it had no physiological action, and therefore he still reserved his opinion on the question of the parathyroids. This was the first time he had heard of any effects of ovarian extract. It was assumed by the President that he had attempted to disparage clinical evidence, but he did not mean to do this, but only to dwell on the necessity of controls and a full record of cases.

ROYAL ACADEMY OF MEDICINE IN IRELAND:

MEDICAL SECTION.

A MEETING of this section was held on Jan. 5th, with Dr. T. GILLMAN MOORHEAD, the President, in the chair.

Dr. LEONARD ABRAHAMSON read a paper entitled

Two Cases of Paroxysmal Tachycardia

illustrated by electro-cardiograms. He pointed out that the term "paroxysmal tachycardia" has been applied to various conditions differing essentially in mechanism. A case of sudden acceleration of the heart rate might belong to one of four groups: (1) Paroxysms of simple or sinus tachycardia; (2) paroxysms of auricular fibrillation; (3) paroxysms of auricular flutter; (4) paroxysms of extra-systoles. Dr. Abrahamson's first case exemplified a paroxysm of extra-systoles. The patient, a female aged 22, who presented a stenosis and regurgitation of the mitral valve, was first seen in the out-patient department of Mercer's Hospital on Monday, July 11th, 1922. She was then suffering from a paroxysm of tachycardia which had commenced abruptly on the previous Sunday. Electro-cardiograms showed a series of extra-systoles, rate 200–205 per minute. The second case demonstrated a paroxysm of auricular fibrillation, rate 170–180, occurring in a male, aged 58, the subject of advanced myocardial disease. The tracings were shown in order to demonstrate the difference between the mechanism of this paroxysm and of the preceding one. After the subsidence of the attack, the patient developed a chronic auricular fibrillation.

The PRESIDENT inclined to retain the general term paroxysmal tachycardia, for often it was difficult in rural cases to make an exact diagnosis. As to treatment, he had recently seen a case in which the patient was immediately able to check the tachycardia by pressing deeply on each side of his neck.—Dr. H. F. MOORE preferred to retain the term paroxysmal tachycardia provided that it was only employed in a clinical sense. He was of opinion that nurses should be taught to use the stethoscope to count heart beats.

The PRESIDENT read a short paper on

Milk Anaphylaxis,

using the term to signify a special sensitiveness on the part of some patients to milk. He protested against the almost universal and indiscriminate use of milk in cases of gastric disorder, and pointed out that in many cases the use of this fluid merely aggravated the condition that it was intended to cure. He reported a case in which, after two operations had been performed and nothing wrong being found, relief was immediately obtained by stopping all milk food. During the progress of the case on one or two occasions milk was given accidentally, and was each time followed by the occurrence of acute gastric pain and vomiting.

Sir JOHN MOORE agreed with the President that milk sometimes was one of the worst things which

could be given to patients; whey and egg water, raw meat juice, and port wine were good substitutes.—Dr. ABRAHAMSON described a case of mucous colitis cured by forbidding milk.—Dr. T. P. C. KIRKPATRICK said that Dr. Hastings Tweedy had regarded milk as the worst form of food which could be given to a patient suffering from eclampsia. Milk was a satisfactory diet only for patients who liked it.—Dr. G. E. NESBITT asked whether the President had any faith in the skin tests which had lately been largely used.—Dr. T. J. D. LANE said it was important to find out whether when milk disagreed this was due to anaphylaxis or not. If the patient gave an anaphylactic response to ordinary milk and not to boiled milk, that was a point in favour of anaphylaxis.—Dr. MOORE said he believed excellent results had been obtained by means of skin tests.—Dr. KENNEDY CAHILL gave details of numbers of cases in which a milk diet had proved harmful.—Dr. R. J. ROWLETTE had also had experience of cases in which milk appeared to increase the disorder.—Dr. C. PILE suggested that the substitution of hot water for milk diet in cases of catarrhal jaundice might cause cases to clear up more quickly.

Dr. NESBITT read notes on

Renal Efficiency Tests.

He demonstrated three tests which he had found most serviceable—viz., the urea-concentration test, the estimation of blood-urea, and the excretion of phenol-sulphone-phthalein. He had followed for the most part the methods and technique recommended by Prof. H. Maclean and had found them very satisfactory. He had made some minor alterations in the estimation of blood-urea which he thought were advantageous—one was the addition of a side tube by means of which alcohol could be added at any time to control frothing, and another was the immersion of the blood tube in a jacket of warm water during distillation, which brought over the ammonia more thoroughly and quickly. As regards the value of the tests, he thought no just opinion could be expressed in a doubtful case of nephritis based on clinical findings alone, nor should serious genito-urinary surgery be undertaken till the condition of the kidneys had been ascertained by some such means as these. Not the least value of the tests was the possibility of demonstrating sound renal function in cases which had been rejected for life insurance, or been treated as chronic invalids on account of the presence of albumin and even casts in the urine. He thought the urea-concentration test the most reliable. High blood-urea in chronic cases was of serious prognosis, but a low figure was not necessarily favourable. The phenol-phthalein test should always be used in conjunction with other tests, or it might mislead.

Dr. MOORE said that these tests were valuable when carried out in conjunction with the ordinary physical examination of patients.—Dr. V. M. SYNGE said that he had found the curve of water excretion a very simple and reliable guide in these cases.—Mr. C. E. BRUNTON said he had carried out a critical examination of the blood-urea estimation in conjunction with Dr. Fearon with a view to the discovery of fallacies, and they had discovered quite a number. He was much interested in the steps taken by Dr. Nesbitt to counteract some of these. He thought the use of the warm water jacket was an important addition to the technique.

LIVERPOOL MEDICAL INSTITUTION.

A MEETING was held on Jan. 4th, with Prof. J. HILL ABRAM, the President, in the chair.

Mr. R. C. DUN read a note on

Chronic Intussusception in Children.

Mr. Dun referred to ten cases. All were operated on and recovered. In no case was there any difficulty in reduction and no adhesions were found. The average age of the children affected was 5 years. The duration of symptoms was from four weeks to two and a half years. An abdominal tumour was felt in six out of the ten cases. Blood and mucus was passed per rectum in only two of the cases, and in no case was complete obstruction reached. In none of the cases was any definite pathological condition found which would account for the formation of the intussusception.

Mr. J. T. MORRISON said there were cases with borderline symptoms between the acute and chronic types. One case, a boy, aged 18 months, having previously had a typical ileo-cæcal acute intussusception, was again seized with a similar attack. Operation showed a pure colic intussusception easily reducible and without œdema or congestion. Another case, a boy, aged 5 years, had symptoms of acute obstruction of a definite but not very severe type necessitating immediate operation. There was no blood or mucus, but a vague tumour in the right side of the abdomen. Previous health had been excellent. At operation a very easily reducible intussusception of the ileo-cæcal type was found. There was practically no œdema of the apex. During convalescence he had an attack of fever (104° F.), blood and mucus in the stools, of one day's duration. Otherwise there were no further symptoms. Was this an abortive attack of intussusception or was this merely an attack of enteritis?

Dr. A. DOUGLAS BIGLAND read a note on the

Diagnosis and Treatment of Migraine.

He pointed out that only one event of the migraine attack might be the sole feature, and that therefore diagnosis was not always easy. He described cases and advocated treatment by calcium salts.

Dr. T. W. WADSWORTH described a case of

Syphilis of the Lung

in a patient, aged 17, who complained of cough and slight expectoration for six months. She was poorly nourished, fingers clubbed, incisor teeth notched, Wassermann reaction positive, sputum negative as regards tubercle bacilli. There was an area of dullness just below the inferior angle of the left scapula. The breath sounds were bronchial in this area and there was pectoriloquy and crepitations. X ray of the chest showed a shadow corresponding to the area found clinically. After treatment with iodides and mercury and an injection of 0·3 g. N.A.B. the physical signs cleared up and the X ray of the chest demonstrated that the opaque area had almost vanished. From the evidences of syphilis, the absence of tubercle bacilli, and the response to treatment the diagnosis was established.

Mr. H. HAWARD BYWATER read a paper on

Night-Blindness.

Mr. Bywater divided the condition into two groups: (1) the congenital and hereditary forms; (2) the acquired varieties. The first group comprised the rare congenital form with normal fundi, which was stationary, and the three hereditary conditions: (*a*) retinitis pigmentosa (and its non-pigmentary form); (*b*) retinitis punctata albescens; (*c*) gyrate atrophy of the retina and choroid, which were progressive. The second group comprised: (*a*) acquired retino-choroiditis as syphilitic (which becomes stationary if treated); (*b*) epidemic night-blindness (this, the most important form, might or might not be associated with xerosis of the conjunctiva); (*c*) physiologic night-blindness of the one-eyed, described by Thomson Henderson. After giving reasons why myopes and hypermetropes had difficulty in seeing at night, Mr. Bywater gave particulars of 70 cases of night-blindness seen in Salonika by Major Usher and himself in 1917, with the tests applied. He mentioned that 14 out of 70 were men who had only useful vision in one eye. The cases of the epidemic form of night-blindness occurred in miners during the last coal strike, and of xerosis in children. After briefly discussing the theories of

night-blindness, he described the experiments to prove that visual purple formation is carried out by the eye itself independent of the central nervous system. The changes in the visual purple appeared to be due partly to ultra-violet rays of greater length than 300 microns and partly by rays of the visual spectrum. Experiments to show the protection given by the media of the eye against the harmful rays of bright light were mentioned, and, finally, the diagnosis and treatment of the different varieties.

Dr. A. E. BURROUGHS considered the most interesting aspect of night-blindness to be the congenital stationary type, that in which night-blindness exists along with no other apparent abnormality of the eyes. This was purely hereditary and occurred in families, often through many generations. A full account, giving extensive family trees of affected families, had just been issued from the Eugenics Laboratory of Prof. Karl Pearson. A type had appeared in which the female members of a family escaped, but passed it on to the males. The affection was supposed to be rare, and in its higher degrees it no doubt was so, but he had come across many cases of modified congenital stationary night-blindness, especially noticeable at the time of the lighting restrictions during the war.

Reviews and Notices of Books.

STUDIES IN PSYCHO-ANALYSIS.

By CHARLES BAUDOUIN, Author of "Suggestion and Auto-suggestion." Translated from the French by E. and C. PAUL. London: George Allen and Unwin. 1922. Pp. 351. 12*s.* 6*d.*

Prof. Baudouin describes a combination of suggestion with psycho-analysis, and although he narrows the latter term to mean a method and not a body of doctrine, yet his method differs in essentials from that recognised as psycho-analysis. The use of suggestion to overcome resistances, for example, was abandoned by Freud when he perfected his method of free association, for he considered that the overcoming of resistances by the patient's own efforts was, in fact, of more importance than the revival of memories. The statement that the form taken by the transference—i.e., the affective relationship of subject to operator—is involuntarily imposed by suggestion from the analyst embodies a fundamental difference in observation. "If we invite the subject to expect its appearance in a certain form, and if we ourselves expect it to appear in this form, the odds are that, thanks to the working of suggestion, the expected will happen" (p. 114), is a sentence that might even lead us to misjudge the author's knowledge of his subject, for it is the kind of thing one hears from critics whose acquaintance with psycho-analysis rests upon hearsay. Nevertheless, the relation of suggestion to transference is admitted, though here again a vital difference of viewpoint is manifest; the aim of analysis is to free the patient from his own inhibitions and from the temporary dependence upon the analyst; but the author quotes approvingly (p. 116) a comparison of psycho-analysis to the spiritual directorship of the confessional, a comparison especially misleading to any reader who tends to confuse confession with the analysis of the unconscious. These faults are to be regretted.

One aim of the book is to introduce psycho-analytical theories to French readers, most of whom, says Prof. Baudouin, are beginners, but even if his views are sound they should not be presented under the guise of psycho-analysis. The combination of analysis and suggestion is justified by the length and expense of analytical treatment, and the author describes, among others, the case of a patient suffering from timidity and undue scrupulosity who was rapidly cured by a combined method. We have to thank workers like Prof. Baudouin for simplifying and placing at our service whatever of curative value there is in suggestion, but he does not show whether, or how, suggestion differs from the methods of healing by faith that have hitherto, with more or less success, mocked at orthodox medicine. The "law of subconscious teleology"—"When the end has been suggested, the subconscious finds means for its realisation," only means that the process is not accompanied by awareness, and its unsatisfying nature is not lessened by the naïve remark that "The subject may be entirely ignorant of physiology and may remain quite unaware of what is going on within him" (p. 110).

The exposition of theory contains a useful chapter tracing the relation between modern views of affective association and the older ones that based association upon the laws of contiguity, similarity, and contrast, but it leaves us wondering what psycho-analysis is and what is its relation to treatment. The cases described later are equally inconclusive, that of "Alfred," for instance, being merely an example of the "analyst" explaining to the patient what he thought was the motive of his stammer. The translators are over-enthusiastic when they prophesy: (p. 12) "The student will return with delight to the clarity of what is destined to become known as the Geneva School, and will read the Studies again and again." But this volume will interest many people who are seeking to find connexions between opposite schools of thought in psychotherapy.

PRACTICAL PHYSIOLOGY.

By E. P. CATHCART, M.D., D.Sc., F.R.S., Gardiner Professor of Chemical Physiology, University of Glasgow; D. NOËL PATON, M.D., LL.D., F.R.S., Regius Professor of Physiology, University of Glasgow; and M. S. PEMBREY, M.A., M.D., F.R.S., Professor of Physiology, Guy's Hospital, University of London. London: Edward Arnold and Co. 1922. Pp. 344. 18*s.*

THIS book is based on a work, now out of print, by A. P. Beddard, J. S. Edkins, M. Flack, L. Hill, J. J. R. Macleod, and M. S. Pembrey. These six authors were all at the time teaching physiology in London medical schools, but in the present edition the centre of gravity has shifted to Glasgow, except for the section on advanced experimental physiology, by Prof. Pembrey. A result of this compromise may be that the courses outlined will not be wholly acceptable at either school, or at any other, though no doubt a little adaptation would fit them for most medical schools. The most difficult of the courses to adapt would be that on Elementary Experimental Physiology, for this begins with observations on the special senses, where most courses end, and further, some of the apparatus described, the electric supply for instance, is not to be found in most laboratories. The exercises chosen in the various courses are of the kind given in most medical schools, and questions relating to them are set at most examinations. Courses of mammalian or human physiology are only very partially realisable in practice, and although the authors say in the preface that "practical work should have a direct relation to medicine and, as far as possible, the experiments should be performed upon man," the subsequent text demonstrates the impossibility of this being properly done.

Although on the whole the instructions for the performance of experiments are clear enough, instances of ambiguous writing are not hard to find: thus p. 169, "Take the temperature of a mouse in the rectum and then place it in a dry thermostat"; p. 170, "If the animal be now laid on a table with its limbs spread out"; or p. 146, "In comparing the tints hold the tubes against the skylight." As students often take things very literally, such loose wording is dangerous. In the chemical section, it should be pointed out that the illustrations of crystals are far too large—a figure of a hæmin crystal half an inch in length would puzzle students enormously. In dealing with the determination of the oxygen capacity of blood, the use of the new Haldane or Barcroft apparatus could have

been described just as easily as the method requiring 20 c.cm. of blood.

These represent the only faults we have to find with the book; in its favour we can say that it does really present a course of work which is possible in most schools, that the instructions and the theoretical parts are adequate, and that the exercises chosen show good balance, as little stress as possible being laid on merely academic experiments on frog's legs, apart from classical experiments which illustrate fundamental truths.

TROPICAL DISEASES.

Fourth edition. By E. R. STITT, Rear-Admiral, Medical Corps, and Surgeon-General, U.S. Navy. London: H. K. Lewis and Co., Ltd. 1922. Pp. 622. 18s.

THE first edition of this useful and handy little manual appeared only eight years ago; since that time three other editions have appeared, testifying to the deserved popularity of the book. In this edition yellow fever has been definitely included amongst the protozoal diseases, and a full account of the *Leptospira icteroides* and the more recent advances in the pathology and treatment based upon Noguchi's work have been well set out. Epidemic jaundice and rat-bite fever are more briefly treated. In the account of plague we miss mention of the recent work of L. F. Hirst and F. W. Cragg on *Xenopsylla astia*, possibly because its significance has only recently been recognised. An account of tularæmia, a mysterious but extremely obnoxious plague-like fever, is given; this is primarily a disease of rodents, caused by an organism, *Bacterium tularense* (discovered by McCoy and Chapin in 1911), but which is transmitted to man by a horse-fly, *Chrysops discalis*, previously having imbibed the blood of infected jack-rabbits. As a result of accidental infection it seems that almost 100 per cent. of those engaged in investigating tularæmia themselves contract it.

The sections on pellagra and beri-beri have been revised in accordance with recent advances. In Chapter XXV. are included tables of important animal parasite diseases, protozoal, helminthic, and arthropodan. One of the defects of this little book is the unsatisfactory nature of some of the illustrations; even when objects have to be reproduced on a small scale, some indication should be given of the actual magnification, or the student can obtain no idea of the relative size of objects. An example of this need is illustrated in Figs. 119 and 120, where the embryo *Strongyloides intestinalis* in the latter, which is 0·2 mm. in length, is depicted twice the size of *Fasciolopsis buski*, in reality 30 mm. In Figs. 30 and 31 the legends have become transposed. The broad outlook of the author is nowhere better illustrated than in the section devoted to diagnostic problems and procedures, together with a consideration of cosmopolitan diseases in the tropics; the tropical practitioner is reminded that in addition to his knowledge of parasitology he must be familiar with the principles and practice of general medicine.

X-RAY TECHNIC FOR DIAGNOSIS.

Principles and Practice. By JOHN A. METZGER, M.D., Roentgenologist to the School for Graduates of Medicine, Medical Department, University of California, Los Angeles. London: Henry Kimpton. 1922. Pp. 144. 14s.

THE author's aim in the preparation of this book is to put into the hands of the student and operator a formula on which to base his work in order that he may obtain better results and thus be able to reach a more correct diagnostic interpretation. The table of exposures given is not meant to be followed as a fixed rule, but the exposures are those which have given the author the best results. Dr. Metzger is certainly successful in helping the beginner to get an idea of the detailed technique of radiophotography and a sound basis on which to start practical work. As in many volumes of limited scope, the selection of matter to be included has obviously been a difficulty. The glossary of terms at the beginning of the book might well be left out of a later edition, because such definitions as "Atom—an ultimate indivisible particle of matter," or "Current Controller—a device or rheostat for controlling current," or, again, "Erg—the unit of work," are of little value. The description of the Bucky diaphragm is incomplete, as it gives no details of the structure of the diaphragm while attempting to explain how it works. Work with the fluorescent screen is described in less detail than the taking of photographic plates. The photographs of the positions in which the patient is placed for regional examinations are excellent, and the section on development is helpful. The differences of nomenclature used in America have produced words that look clumsy to British readers, such as roentgenogram, pyeloroentgenography, kinematography, or bioroentgenography, and roentgenologist; radiologist and skiagram are rarely employed. The expression "plating" is here used for taking an X-ray photograph; this is unfortunate, since "plating" has a definite surgical meaning, and words which already have a technical significance should not lightly be used in another sense.

The book as a whole is a sound and useful guide to the technique of radio-diagnosis.

ANATOMY.

Cunningham's Text-Book of Anatomy. Fifth edition. Edited by ARTHUR ROBINSON, M.D., F.R.C.S. Edin. London: Henry Frowde and Hodder and Stoughton. 1922. Pp. 1577. 42s.

THE new issue of this standard work shows certain changes in the names of those responsible for the sections and in the detail of its contents. Dr. E. B. Jamieson has taken up the osteological revision which Prof. A. Thomson was unable to execute, Profs. Whitnall and Johnston have revised the portions originally written by the late Prof. Paterson, and Prof. J. T. Wilson, of Cambridge, has entirely rewritten and enlarged the scope of the section dealing with ductless glands. The names of the contributors, the able editorship of Prof. Robinson, and the reputation of "big Cunningham" are sufficient guarantees of the excellence of the book, which has become established as one of the best of its kind, as it has always been. It is wonderfully free from slips. A mistake in labelling in Fig. 196, bearing on the attachments of tendons by the bicipital groove, will bear correction.

Altogether an admirable production.

Practical Anatomy. Second edition. By R. J. A. BERRY, M.D. Edin. & Melb., F.R.S.E., F.R.C.S. Edin., Professor of Anatomy in the University of Melbourne. London: H. K. Lewis and Co., Ltd.; Melbourne: Robertson and Mullen's, Ltd. 1922. In four volumes.

THE first edition of this work met with considerable success in Australia and elsewhere, and Prof. Berry has taken advantage of the early demand for another issue to revise and alter in many ways the original production. His object has been to produce an "anatomy of the living" rather than of the dead, and to direct the mind of the inquiring student towards paths of proved clinical worth rather than to allow him to abide in the fields of pure anatomy. This is an ideal which many have set up before them, but we cannot at the moment recall the names of any who were conspicuously successful in their efforts to reach it. Nor is it hard to see the reason for this; the structure or connexion which may seem to one writer of merely anatomical interest may, in the mind of another, have a definite clinical or pathological value, or some small experience at the bedside may lead one man to see the worth of a piece of anatomical information, although the vision may be entirely denied to another—possibly because he is lacking in such information. As an example of the first of these possibilities we may point to the fact that the author

of this work does not seem to consider a description of the details of the arterial arrangements of the intestine to be of clinical importance, which is not the opinion, we imagine, of Latarjet and many others; parallel instances can be found in large number in every book that essays to draw the line between the essential and non-essential in anatomical matters. So far as the anatomical part of the work is concerned, and its value to the anatomical student, the mere fact that a second edition has been so soon called for is enough in itself to show that Prof. Berry has expended his great labour to good purpose. We confess that we do not share his great admiration for Ellis's plates, when reduced and removed from their surroundings. We cannot help feeling that clear diagrams and schemes are more helpful to a student who wishes to see how a structure gets there, than the most artistic production, when there is always available the actual material for reference. A few diagrams showing the courses of tracts would add to the value of the excellent volume dealing with the central nervous system. The printing is clear and good, and the work is well got up, and altogether, though we may consider Prof. Berry's ideal impossible of achievement, we congratulate him on the appearance and general scheme of the second edition of his work.

A Manual of Surgical Anatomy. Second edition. By LEWIS BEESLY, F.R.C.S. Edin., and T. B. JOHNSTON, M.B., Ch.B. London: Henry Frowde and Hodder and Stoughton. 1922. Pp. 561. 18*s.*

THIS is an excellent little book, which will well repay study by practitioners and senior students. The importance of the subject will, we hope, lead in future editions to more extended treatment of the lumbrical-space connexions with Kanavel's fascial spaces in the hand. We disagree with the authors in what appears to be their view of the axes of movement in the jaw-joint, and in one or two other minor matters, but this does not lessen our appreciation of the work which, in most respects, could hardly be improved upon.

Topographisch-anatomische Sezierübungen. By Dr. FRANZ KISS, Prosektor am anatomischen Institut der Universität Ofenpest. Lehmanns Medizinische Lehrbücher. München: J. F. Lehmann. 1922. Pp. 83. 10*s.*

THIS little book is intended for the use of those who wish to run over the topographical points after they have acquired a fundamental acquaintance with the body at large. The brain and the visceral contents of the thorax and abdomen do not come within the scope of the work. Each region is defined and then described in the general order of dissection, and the descriptions are good and reliable. The illustrations are at first sight somewhat startling in their colour schemes, but this can be supported on certain grounds. We would, however, recommend more careful inspection of the labels attached to exposed structures in some of the figures, and we have detected one or two textual misprints. The book appears to serve its purpose very well.

ABERDEEN MEDICO-CHIRURGICAL SOCIETY.

The Records of the Aberdeen Medico-Chirurgical Society, 1789–1922. By JOHN SCOTT RIDDELL, President of the Society. Aberdeen: W. and W. Lindsay. 1922. Pp. 144. 4*s.* 6*d.*

THIS interesting book is an expansion of the annual address delivered before the Aberdeen Medico-Chirurgical Society in 1922. In his introduction Mr. Riddell gives us an amusing account of his struggles, as the fatal day of delivery approached, to find a subject. His first idea, that of giving a sketch of an old-fashioned country practitioner, he rejected as not being dull enough for a presidential address; draft No. 2 entitled "Sign Posts and Milestones" was rejected as being too dull. Then a happy thought struck him—to call his address "A Hundred Years After" and take for his text the presidential address of 1822. Careful search of the Minutes for 1822 revealed that there was no presidential address in 1822, neither for many years before and after that date. Determined not to be beaten, Mr. Riddell went back to the very early days of the Society and found that every one was president in turn, a presidential address was delivered at every meeting, and there was a meeting once a week. It is pleasing to note that the Minutes of the meeting of Oct. 15th, 1790, say, "We then proceeded to the Tavern, where we spent the greater part of the Meeting in Mirth and Jollity." So Mr. Riddell decided to write a compendium of the sayings and doings of the Society and to give such historical incidents as he deemed would be amusing, gathered from the stores of knowledge which he had acquired from delving into its records. And a very interesting book he has made of it.

This ancient medical society was founded as the Aberdeen Medical Society by James McGrigor and sundry others in 1789 "on a basis of self and mutual help and was pervaded by a spirit of great earnestness and high endeavour." James McGrigor was in later life Wellington's chief medical officer in the Peninsula, receiving a knighthood for his services, and from 1815 to 1851 Director-General of the Army Medical Department. The minutes of the early days of the Society's activities contain various references to the procuring of subjects for dissection, and it is characteristic of the sportsmanship of Aberdeen students that they took the whole risk of robbing the graves themselves and did not depend upon professional resurrection men. The varying fortunes of the Society and its relation with the two universities, King's College and Marischal College (they were united in 1860 as the University of Aberdeen), are well described—indeed, the whole book is worth reading. We may note one item of special interest to ourselves—namely, that the *Aberdeen Lancet*, founded in 1831, was brought into being by "a Society of Young Gentlemen, who had observed the benefit to the Medical Profession of the operation of the London *Lancet*." Mr. Riddell's quotations suggest that the northern journal was in no way inferior in vigour to its London predecessor.

FLAVOURING MATERIALS.

Natural and Synthetic. By A. CLARKE, F.C.S. Oxford Technical Publications. London: Henry Frowde and Hodder and Stoughton. 1922. Pp. 166. 8*s.* 6*d.*

THIS is an interesting little book dealing with spices, condiments, and flavouring bodies, with the preparation and analysis of essential oils, with perfumes, and with odorous chemical products generally. Many interesting fields of research are indicated in notes which are for the most part arranged under alphabetical headings, while the introduction contains a useful bibliography for readers who wish to study recent progess in the classification of perfumes and the correlation of odour with chemical constitution. The author is right, from the medical point of view, to dwell upon the importance of flavouring compounds in the assimilation of foodstuffs, for the digestion of food is greatly increased by its palatability. Many who are doing a full day's work find their relish for food at the end of the day has waned, and at the very time when their largest meal is placed before them. A little ingenious experimentation with flavouring agents may work wonders here, as it does with the small appetite of the convalescent. Some useful hints are given in various places upon adulterants, and it may come as a surprise to some readers to learn how numerous are the substances which are used as partial substitutes of spices and condiments. The same baneful practices appear to exist in the preparation of essential oils, where the chief methods of sophistication are numerous.

The book summarises in a brief and readable fashion a great deal of information of real value.

Edward Jenner.

BORN MAY 17TH, 1749—DIED JAN. 26TH, 1823.

Edward Jenner, who was born on May 17th, 1749, at Berkeley in Gloucestershire, died on Jan. 26th, 1823, in his house at that same village, where he spent the greater part of his life, and where in 1796 he performed the first vaccination. We print below the first and hitherto unpublished summary of his own observations on his work, as contained in the holograph manuscript in the library of the Royal College of Surgeons of England. The manuscript consists of 45 quarto pages, the numbers of which we indicate in brackets in the text. We have deleted certain references to an illustration and to what was apparently a case-book, neither of which are now available. On a blank page at the beginning is a note, also in Jenner's own hand, which reads: "On the Cow Pox. The original paper." Certain emendations in the text suggest that he intended to send the paper to some society, but no evidence exists to show that it was ever sent. In June, 1798, Jenner published an amplification of his observations; this classic treatise was entitled "An Enquiry into the Causes and Effects of the Variolæ Vaccinæ, a Disease discovered in some of the Western Counties of England, particularly Gloucestershire, and known by the name of the Cow Pox." This book, "printed for the author by Sampson Low, No. 7, Berwick-street, Soho, and sold by Law, Ave-Maria-lane; and Murray and Highley, Fleet-street," is a quarto of 75 pages, dedicated to Dr. C. H. Parry of Bath. It contains coloured plates, one of which shows the hand of Sarah Nelmes with vaccine pustules upon it. We are indebted to the Curator of the Wellcome Historical Medical Museum for permission to reproduce the illustrations which accompany the article.

AN INQUIRY INTO THE NATURAL HISTORY OF A DISEASE KNOWN IN GLOSTERSHIRE BY THE NAME OF THE COW-POX

[1] The deviations of Man from the state in which he was originally plac'd by Nature seem to have proved to him a prolific source of Diseases. From the love of splendor, from the indulgences of Luxury, & from his fondness for amusement, he has familiariz'd himself with a great number of animals which may not originally have been intended for his associates. The Wolf,[1] disarm'd of ferocity, is now pillow'd in the Lady's lap. The Cat, the little Tyger of [2] our Island, whose natural home is the Forest, is equally domesticated & caress'd. The Cow, the Hog, the Sheep & the Horse, are all for a variety of purposes brought under his care & dominion.

There is a disease, to which the Horse, from his state of domestication, is frequently subject. The Farriers have termed it *the Grease*. It is an inflammation & swelling in the heel, from which issues matter possessing properties of a very peculiar kind. It is capable of generating a Disease in the human body (after it has undergone the modification which I shall presently speak of) which bears so strong a resemblance to the smallpox, that I think it highly probable it may be the source of that Disease. [3] In this dairy Country, a great number of Cows are kept.

The office of milking is here perform'd, indiscriminately, both by Men & Maid Servants. One of the former having perhaps been appointed to apply dressings to the heels of a Horse affected with *the Grease*, and not paying due attention to cleanliness, incautiously bears his part in milking the Cows, with some particles of the infectious matter adhering to his fingers. When this is the case it commonly happens that a disease is communicated to the Cows, &, from the Cows, to the Dairy Maids, which pretty rapidly spreads until most of the Cattle and domesticks of the Farm feel its unpleasant consequences. It first appears on the Nipples of the Cows in the form of irregular Pustules. They are seldom white, but more commonly of a palish blue, or rather of a colour somewhat approaching to livid, & are generally surrounded by an erysipelatous Inflammation, & [4] These Pustules, unless a timely remedy be applied are much disposd to degenerate into phagedenic ulcers which prove extremely troublesome.[2] The Animals become indispos'd and the secretion of Milk is much lessend. Several inflam'd spots appear on different parts of the hands [5] of the Domestics employ'd in milking, and sometimes on the Wrists, which quickly run on to suppuration first assuming the appearance of the small vesications produc'd by a burn. Most commonly [6] they appear on the joints of the fingers; but whatever parts are affected, if the situation will admit, these superficial suppurations put on a circular form, with their edges more elevated than their centre, and of a colour distantly approaching to blue. Absorption takes place, and Tumors appear in each Axilla—the System becomes affected—the pulse is much quickend, and shiverings with general lassitude & pains about the loins & limbs, with vomiting, come on. The Head is painful, and the patient is now & then even affected with Delirium. These symptoms, varying in their degrees of violence (for they rarely attack so severely) generally continue from one day to three or four, leaving ulcerated sores about the hands, which, from the sensibility of the parts, are very troublesome, [7] frequently becoming phagedenic like those from whence they sprang, and commonly heal slowly. The Lips, Nostrils, Eyelids, and other parts of the body are sometimes affected with sores; but these arise from their being heedlessly rubb'd or scratch'd with the Patient's infected Fingers. No eruptions of the skin have follow'd the decline of the feverish symptoms in any instance that has come under my inspection, one only excepted, & in this a very few only appear'd on the arms. They were of a vivid red colour, very minute and soon died away without advancing to maturation; so that I cannot determine whether they had any connection with the preceding symptoms, but am induc'd to think they had not.

Thus the disease makes its progress from the Horse to the Nipple of the Cow, & from the Cow to the human subject.

[8] Morbid matter of various kinds, when absorb'd into the System, may produce effects in some degree similar; but what renders the cow-pox virus so extremely singular, is, that the Person, who has been thus affected, is for ever after secure from the infection of the small-pox; neither exposure to the variolous effluvia, nor the insertion of the matter into the skin producing this malady. In support of this assertion I shall produce many instances. I *could* produce a great number more; but, the following I presume will be fully sufficient to establish the fact very satisfactorily.

[9] Case 1st.

Joseph Merret, now an under Gardener to the Earl of Berkeley, lived as a Servant with a Farmer near this place in the year 1770 and occasionally assisted in milking his masters Cows. Several Horses, belonging to the Farm, began

[1] The late Mr. John Hunter proved by experiments that the Dog is the Wolf in a degenerated state.

[2] They who attend sick Cattle in this Country find a speedy remedy for stopping the progress of this complaint, in those applications which act chemically upon the morbid matter, such as solutions of the Vitriolum Zinci, the Vitriolum Cupri, etc.

It is of importance to remark that there are other causes besides contagious matter which produce Pustules & sometimes ulcerations on the Nipples of Cows; and instances have occurr'd, of the hands of the Servants employ'd in milking being affected with sores in consequence, and even of their feeling an indisposition from absorption. But these instances are very rare. This Complaint appears at various seasons of the year, but most commonly in the spring, when the Cows are first taken from their winter food and fed with grass. It is very apt to appear also when they are suckling their young.—But this disease is not to be consider'd as having any kind of connection with that of which I am treating, as it is incapable of producing any specific effects on the human constitution. This distinction between the two Diseases becomes the more important, as the want of it might occasion an idea of security from the infection of the smallpox which would prove delusive.

to have sore heels, which Merret frequently attended. The Cows soon became affected with the Cowpox; &, presently after, several sores began to appear upon his hands. Swellings and stiffness in each Axilla follow'd and he was so much indispos'd for several days, as to be incapable of pursuing his ordinary employment.

In April 1795, a general inoculation taking place here, he was inoculated with his family: so that a period of twenty five years had elaps'd from his having the Cow-pox to this time. However, tho' the [10] variolous matter was repeatedly inserted into his arm, he could not be infected with it; an efflorescence only, taking on an erysipelatous look about the centre, appearing on the skin near the punctur'd parts. During the whole time that his family had the smallpox, one of whom had it very full, he remained in the house with them, but received no injury from exposure to the contagion.

It may be necessary to observe, it was clearly ascertained previous to this attempt to produce the disease, that neither this Patient, or any other whose case is here represented, ever had the smallpox.

[11] Case 2nd.

Sarah Portlock of this place was infected with the Cowpox, when a servant at a farmers in the neighbourhood, twenty seven years ago. In the year 1792 conceiving herself from this circumstance secure from the infection of the smallpox, she nurs'd one of her own children who had accidentally caught the disease, but no indisposition ensued in consequence. During the time she remaind in the infected room, variolous matter was inserted into both her arms, but without any further effect than in the preceding case.

Case 3rd.

John Phillips a Tradesman of this Town had the Cowpox at so early a period as nine years of age. At the age of 62 [12] I inoculated him, and was very careful in selecting matter in its most active state.[3] It was taken from the arm of a Boy just [13] before the commencement of the eruptive Fever and instantly inserted. It very speedily produc'd a sting-like feel in the [14] part. An efflorescence appeard, which, on the 4th day, was rather extensive, and some degree of pain & stiffness were felt about the shoulder; but, on the 5th day, these [15] symptoms began to disappear, and, in a day or two after, went entirely off without producing any effect on the System.

[16] Mary Barge, of Woodford, in this Parish, was inoculated with variolous matter in the year 1791. An efflorescence of a palish red colour soon appeard about the parts where the matter was inserted, and spread itself rather extensively, but died away in a few days without producing any variolous symptoms.[4]

She has since been repeatedly employ'd as a Nurse to smallpox Patients, without experiencing any ill consequences. This Woman had the Cow-pox when she lived in the service of a Farmer 31 years before.

[17] Case 4th.

I believe it to be very rare for one Individual accidentally to communicate the cowpox to another. My Notes furnish me with one instance only. Mrs. H, a respectable Gentlewoman of this Town, had the Disease when very young. Her hands were extremely sore, & her Nose was inflamd and very much swoln. It was communicated by some of the servants of the Family (who were infected by Cows) and certainly by contact, [18] probably by her handling some of the same family utensils. Soon after this event, Mrs. H was expos'd to the contagion of the smallpox, where it was scarcely possible for her to have escaped it, as she regularly attended a Relative who had the disease in so violent a degree that it proved fatal to him.

In the year 1778, the smallpox prevailing very much at Berkeley, and Mrs H. not feeling perfectly satisfied respecting her safety, no indisposition having followed her exposure to the smallpox, I inoculated her with active variolous matter. The same appearance follow'd as in the preceding Cases; an efflorescence on the arm, without any effect on the Constitution.

Edward Jenner, from an engraving by W. Read (at the Wellcome Historical Medical Museum).

[19] Case 5th.

It is a fact so well known among our Dairy Farmers, that those, who have had the smallPox, either escape the Cowpox, or are disposd to have it slightly, that as soon as the Complaint shews itself among the Cattle, assistants are procured, if possible, who are in that situation, otherwise the business of the Farm could scarcely go forward.

In the Month of May 1796 the Cow-pox broke out at Mr. Baker's a farmer who lives near this place. The disease was communicated by means of a Cow which was purchas'd in an infected state at a neighbouring Fair, and not one of the Farmers Cows consisting of thirty, which was at that time milkd, escaped the contagion. The family consisted of a Man servant, two Dairy Maids & a servant Boy; who, with the Farmer himself, were twice a day employ'd in milking the Cattle. The whole of this [20] family except Sarah Wynne one of the Dairy Maids had gone thro' the smallPox. The consequence was, that the Farmer and the servant Boy escaped the infection of the Cow-pox entirely, and the servt. Man and one of the Maids had each of them nothing more than a sore on one of their fingers, which did not produce the least disorder in the system. But the other dairy Maid, Sarah Wynne, who never had the smallpox, did not escape in this easy manner. She caught the Complaint from the Cows & was effected with it in so violent a degree that she was incapable of doing any work for the space of ten days.

March 28th, 1797 I inoculated this Girl by carefully rubbing variolous matter into two slight incisions made upon the left arm. A little inflammation appeard in the usual manner around the parts where the matter was inserted, but so early as the 5th day it vanished entirely, without producing any effect on the system.

[3] I have often been a witness to very direful effects arising from the improper management of the variolous matter, previous to its being used for the purpose of inoculation. A medical Gentleman (now no more) who inoculated great numbers in this neighbourhood, frequently preserved his matter on a piece of Lint or Cotton, which, in its wet state, was put into a Vial, corked up, & convey'd into a warm Pocket, a situation certainly favorable for producing putrefaction in it. In this state (not unfrequently after it had been taken several days from the pustules) it was inserted into the arms of his Patients, and brought on inflammation in the incised parts, swellings of the Axillary Glands, fever, and (as I have been inform'd by the Patients themselves) eruptions. But what was this disease? Certainly not the smallpox: for, the matter, having from putrefaction lost its specific properties, was no longer capable of producing that malady; they, who had been inoculated in this manner, were as much subject to the contagion of the smallpox, as if they had never been under the influence of this artificial disease; and many, unfortunately, fell Victims to it, who thought themselves in perfect security. The same unfortunate circumstance of giving a disease, suppos'd to be the smallpox, with inefficaceous variolous matter, having occurr'd under the direction of some other Practitioners and probably from the same cause, incautious manner of securing the variolous matter, I avail myself of this opportunity of mentioning what I conceive as of great importance, and, as a further cautionary hint, I shall take the liberty of adding another observation on the subject of inoculation.

Whether it be yet ascertain'd by experiment that the quantity of variolous matter, inserted into the skin, makes any difference with respect to the subsequent violence of the disease I know not; but, I have the strongest reason for supposing that if either the Punctures or incisions be made so deep as to go through it, and wound the adipose covering beneath, that the risk of bringing on a violent disease is greatly increasd.

I have known an Inoculator, whose practice was to go deep enough (to use his own expression) "to see a bit of fat," & there to lodge the matter. The great number of bad Cases & the fatality which attended this practice was almost inconceivable; and I cannot account for it on any other principle than that of the matter being plac'd in this situation instead of the skin; for let it be recollected, that it is only a different mode of receiving the infectious particles that constitutes the difference between Inoculation and the natural smallpox. Tho it is very improbable that anyone would inoculate in this way by design, yet this observation may tend to place a double guard over the lancet when Infants fall under the care of the Inoculator, as the skin is comparatively so very thin. Query—In what manner is the smallPox communicated in what is call'd the natural way?

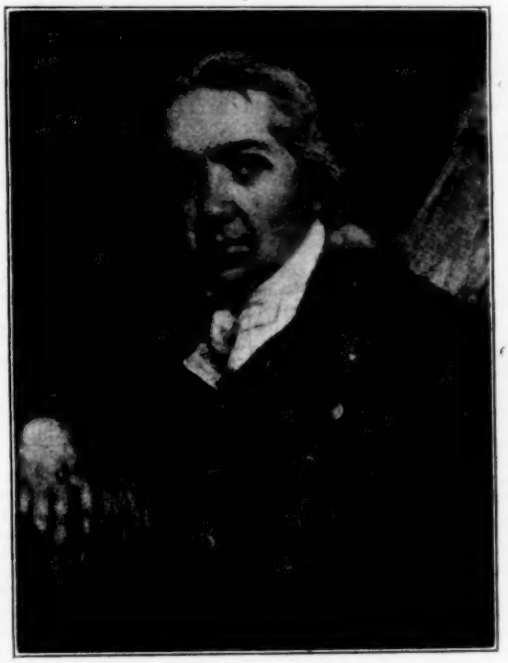
[4] It is remarkable that variolous matter, when the System is disposed to reject it, should incite inflammation on the part to which it is applied more speedily than when it produces the smallpox. Indeed it becomes almost a criterion, by which we can determine whether the infection will be received or not:—It seems as if a change which endures thro life, had been produced in the action or disposition to action in the Vessels of the skin; & it is remarkable too, that whether this change has been effected by the smallpox, or by the cow-pox, the disposition to sudden cuticular inflammation is the same, on the application of variolous matter.

[21] Case 6th.

Although the preceding history pretty clearly evinces that the Constitution is far less susceptible of the contagion of the CowPox after it has felt that of the smallpox; and although in general, as I have observed, they who have had the small Pox & milk Cows which are infected with the Cow-pox, either escape the disease or have sores on the hands only without feeling any general indisposition: yet the following narration is inserted to shew that the animal economy is subject to some variation in this respect.

In the summer of the year 1796 the Cow-pox appeard at the farm of Mr. Andrews, a considerable Dairy adjoining to the town of Berkeley. It was communicated, as in the preceding instance, by an infected Cow purchas'd at a Fair in the neighbourhood. The family consisted of the Farmer, his Wife, two sons, a Man & a Maid servant, all of whom except the Farmer (who was fearful of the consequence) bore a part in milking the Cows. The whole of them, exclusive of the Man Servant, had [22] regularly gone through the small Pox; but in this case no one who milk'd the Cows escaped the infection. All of them had sores upon their hands, and some degree of general indisposition, preceded by pain and Tumors in the Axillae. But there was no comparison in the severity of the Disease as it was felt by the servant Man, who had escaped the smallpox and by those of the family who had not; for, while he was confined to his bed, they were able, without much inconvenience, to pursue their ordinary business.

February the 13th, 1797 I avail'd myself of an opportunity of inoculating Wm. Rodway, the servant Man above alluded to. Variolous matter was inserted into both his arms, in the right by means of a slight incision, and into the left by Punctures. Both were perceptibly inflamed on the 3d day. After this the inflammation about the punctures soon died away, but a small appearance of erysipelas was manifest about the edges of the incision till the 8th day, when a little uneasiness was felt for the space of half an hour in the axilla.[5] The inflammation then hastily disappeared without producing the most distant mark of affection of the system.



Edward Jenner, from Scriven's engraving of the portrait by J. R. Smith (at the Wellcome Historical Medical Museum).

[23] Case 7th.

Elizabeth Wynne aged 57, lived as a servant with a neighbouring Farmer 38 years ago. She was then a Dairy-maid and the Cow-pox broke out among the Cows. She caught the Disease with the rest of the family, but, compared with them, had it in a very slight degree; one very small sore only, breaking out upon the little finger of her hand, and scarcely any perceptible indisposition following. As the Malady had shewn itself in so slight a manner, & as it had taken place at so distant a period of her life, I was happy with the opportunity of trying the effects of variolous matter upon her Constitution; & on the 28th of March 1797 I inoculated her by making two superficial incisions on the left arm, on which the matter was cautiously rubb'd. A little efflorescence soon appear'd and a tingling sensation was felt about the parts until the 3rd day, when both began to subside; and so early as the 5th day, it was evident that no indisposition would follow.

[24] Case 8th.

Altho' the Cow-pox shields the Constitution from the small Pox, & the small Pox proves a protection against its own future poison, yet it appears that the human body is again & again susceptible of the infectious matter of the Cowpox, as the following history will demonstrate.

Wm. Smith, of Pyrton, in this Parish, contracted this disease when he lived with a neighbouring farmer in the year 1780. One of the Horses belonging to the Farm had sore Heels & it fell to Smith's lot to attend him. By these means the infection was carried to the Cows, & from the Cows it was communicated to Smith. One of his hands had several ulcerated sores upon it, and he became very ill with such symptoms as have been before describ'd. In the year 1791 the Cow-pox [25] broke out at another farm where he then lived, & he became affected with it a second time; & in the year 1794 he was so unfortunate as to catch it again. The disease was equally as severe the second & third time as it was on the first. In the spring of the year 1795 he was twice inoculated, but no affection of the system could be produc'd from the variolous matter; & he has since associated with those who had the smallpox in its most contagious state, without feeling any effect from it.

[26] Case 9th.

Simon Nichols lived as a servant with Mr. Bromedge, a Gentleman who resides in this parish, in the year 1782. He was employ'd in applying dressings to the sore heels of one of his Masters Horses, and at the same time assisted in milking the Cows. The Cows became affected in consequence, but the disease did not shew itself on their Nipples till several weeks after he had begun to dress the Horse. He quitted Mr. Bromedge's service, & went to another farm, without any sores upon him; but here his hands began to be affected in the common way, & he was much indispos'd with the usual Symptoms. Being here also employ'd in milking, the Cowpox was communicated to the Cows. [27] Some years afterwards, Nichols was employ'd in a Farm where the smallpox broke out, and I inoculated him with several other Patients, with whom he continued during the whole time of their confinement. The arm inflamed, but neither the inflammation, nor his associating with the inoculated family, produc'd the least effect on the Constitution.

Case 10th.

One instance has occurr'd to me of the System being affected from the matter issuing from the heels of Horses & of its remaining afterwards unsusceptible of the variolous contagion: another, where the smallpox obscurely appear'd; and a third, in which its complete existence was positively ascertaind.

1st. Thomas Pearce was the son of a Smith & Farrier near to this place. He never had [28] the Cowpox; but, in consequence of dressing horses with sore heels at his fathers, when a lad, he had sores on his fingers, which suppurated and which occasioned a pretty severe indisposition. Six years afterwards, I inserted variolous matter into his arm repeatedly, without being able to produce anything more than slight inflammation; which appeard very soon after the matter was applied, and afterwards expos'd him to the contagion of the smallpox, with as little effect.[6]

[29] Case 11th.

2ndly. Mr. James Cole a Farmer in this Parish had a disease from the same source as related in the preceding Case, and some years after, was inoculated with variolous matter. He had a little pain in the Axilla, and felt a slight indisposition for three or four hours. A few eruptions shew'd themselves on the forehead, but they very soon disappeard, without advancing towards maturation.

[5] Variolous matter inserted into the arms of those who have had the small Pox, will often produce sudden inflammation with a little pain & stiffness in the axilla.

[6] It is a remarkable fact & well known to many that we are frequently foild in our endeavors to communicate the smallPox by inoculation to Blacksmiths & Farriers. They often, as in the above instance, either resist the contagion entirely or have the Disease anomalously. We shall now be I presume able to account for this on a rational principle.

Case 12th.

3rdly. Altho' in the two former instances, the System seem'd to be secured, or nearly so, from variolous infection, by the absorption of matter from sores produc'd by the diseas'd heels of horses, yet the following Case decisively proves that this cannot be entirely relied upon until a disease has been generated by the morbid matter from the Horse on the Nipple of the Cow, & pass'd thro' [30] that medium to the human subject.

Mr. Abraham Riddiford a farmer at Stone in this parish, in consequence of dressing a Mare that had sore heels, was affected with very painful sores in both of his hands, tumors in each Axilla, & severe & general indisposition. A Surgeon, in the neighbourhood, attended, who assured him that he would derive one great benefit from his present situation, for, that he never need to fear the infection of the smallpox. But this assertion proved fallacious; for, on being expos'd to the infection upwards of twenty years afterwards, he caught the disease, which took it's regular course in a very mild way. There certainly was a difference perceptible, altho' not easy to describe [31] in the general appearance of the Pustules from that which we commonly see. Other practitioners, whom I requested to visit the Patient with me, agreed with me in this point, tho' there was no room left for suspicion as to the reallity of the disease, as I inoculated some of his family from the Pustules, who had the smallpox in consequence.

Case 13th.

The more accurately to observe the progress of the infection, I selected a healthy Boy about eight years old for the purpose of inoculation for the Cow-pox. The matter was taken from a suppurated sore on the hand of a dairy Maid who was infected by her master's Cows, and it was inserted, on the 14th of May 1796, into the arm of the Boy, by means of two superficial incisions, each about three quarters of an inch long. On the 7th. day [32] he complaind of uneasiness in the Axilla & on the 9th he became a little chilly, lost his appetite and had a slight headach. During the whole of this day he was perceptibly indispos'd, and had rather a restless night; but, on the day following, he was perfectly well. The appearance, and progress of the incisions to a state of maturation, were pretty much the same as when producd in a similar manner by variolous matter. The only difference which I perceived, was, that the edges assumed rather a darker hue, and that the efflorescence spreading 'round the incisions, took on rather more of an erysipelatous look, than we commonly perceive when variolous matter has been made use of for the same purpose.

On the 1st of July following, this Boy was inoculated with Matter immediately [33] taken from a smallpox Pustule. Several Punctures and slight incisions were made in both his arms, and the matter was well rubb'd into them, but no disease follow'd. The same appearances only were observable on the arms, as when a Patient has had variolous matter applied, after having either the Cow-pox, or the small Pox.[1]

[34] I presume it would be swelling this Paper to unnecessary bulk were I to produce further testimony in support of my assertion, "that the Cow-pox protects the human Constitution from the infection of the small Pox." I shall proceed then to offer a few general remarks upon this subject & some others which are connected with it.

Tho I am, myself, perfectly convinced, from a great number of instances which have presented themselves, that the source of the Cowpox is the morbid matter issuing from the newly diseas'd Heels of Horses, yet I could have wish'd, had circumstances [35] allow'd me, to have impress'd this fact more strongly on the minds of my Readers by Exper'ts. They who are not in the habit of conducting Experiments, may not be aware of the coincidence of circumstances, necessary for their being managed so as to prove decisive; nor, how often, Men, engaged in professional employments, are liable to interruptions which disappoint them almost at the instant of completion.

[1] During the whole time these Experiments were going forward, the Boy slept in a bed with two Children who never had been affected with either of these diseases, but neither of the Children became indisposd in consequence. A young Woman who had the Cowpox to a great extent, several sores that maturated having appear'd on her hands and wrists, slept in the same bed with a fellow dairy Maid, who never had been infected with either the small Pox or the Cowpox, but no indisposition follow'd. Another instance has come under my observation of a young woman, on whose hands were several large suppurations from the Cow Pox, and who was at the same time a daily Nurse to an Infant but the Complaint was not communicated to the Child.

The active quality of the Virus from the horses heels is greatly increased after it has acted on the Nipple of the Cow, as it rarely happens that the Horse affects his Dresser with sores, and as rarely that a milkmaid escapes the infection when she milks infected Cows. It is most active at the commencement of the disease, before it acquires a Pus-like appearance, [36] after the disease has been of long continuance the matter ceases to produce specific effects. Whether the Matter, either from the Cow or the Horse, will affect the sound skin I cannot determine, but am inclind to think it will not, excepting where the cuticle is extremely thin, as on the lips. The hands of the farmers servants in this neighbourhood from the nature of their employments are constantly expos'd to those injurys which occasion abrasions of the Cuticle, to punctures from thorns, & such like accidents.

It is curious to observe, that this matter acquires new properties by passing from the horse thro another medium, that of the Cow; that its activity is hereby [37] increas'd, and that those specific properties become unvariable, which induce on the human Constitution symptoms similar to those of the variolous fever, and effect in it that peculiar change, which for ever renders it unsusceptible of the variolous Contagion.

May we not then reasonably infer, that the source of the smallpox is the matter generated in the diseas'd foot of a Horse, and that accidental circumstances may have again & again arisen, still working new changes upon it, until it has acquired the contageous and malignant form, under which we now commonly see it making its devastations among us? And from a consideration of the change which the infectious matter from the Horse has undergone [38] after it has produc'd a disease on the Cow, may we not conceive that many contagious diseases now prevalent among us, may owe their present appearance not to a simple but to a compound origin? For example, is it hard to imagine that the Measles, the scarlet fever, and the ulcerous sore Throat with a spotted skin, have sprung from the *same* source, assuming some variety in their forms according to the nature of their new combinations. The same Question will apply respecting the Yaws and the Syphilis, and indeed many other diseases.

There is certainly more forms than one in which the smallPox appears in what is call'd the natural way. About [39] seven years ago, a species of small-Pox spread thro' most of the Towns and Villages of this part of Glostershire. It was of so mild a nature, that a fatal instance was scarcely ever heard of, & consequently so little dreaded by most of the community, that they scrupled not to hold the same intercourse with each other, as if no infectious disease had been present among them. I never saw nor heard of an instance of its being confluent. It obtain'd the name among the Nurses & the common People (I know not why) of *the swine or Pig-pox*. The most accurate manner, perhaps, in which I can convey an idea of it, is, by saying, that had fifty individuals been taken promiscuously and infected by exposure to this contagion, they would have had as mild & [40] light a disease as if they had been inoculated with variolous matter in the usual manner. The harmless manner in which it shew'd itself could not arise from any peculiarity either in the season or the weather, for I watch'd its progress upwards of a year without perceiving any variation in its general appearance.

I consider it then as a variety of the smallpox.

At what period the Cow-pox was first notic'd here is not upon record. The oldest Inhabitants among the farmers were not unacquainted with it in their earliest days & have heard their forefathers speak of it (and have never heard it recorded).* Yet it is probable that its rise [41] in this Country, may not have been of very remote date, as the practice of

* The words here placed in parenthesis appear in the MS. written immediately below the words "and have heard their forefathers," apparently as an alternative.—ED. L.

milking Cows might formerly have been in the hands of women only; which I believe is the case now in some other dairy Countries, and, consequently, that the Cows might not in former times have been exposd to the contagious matter brought by the men servants from the heels of Horses. Indeed the fact itself, that is, a knowledge of the source of the infection, is new in the minds of most of the Farmers in this neighbourhood; but it has at length produc'd conviction; and probably from the precautions they now seem dispos'd to adopt (for a Farmer is not the most flexible of human Beings) the appearance of the Cow-pox here may either be entirely extinguish'd, or become extremely rare.

[42] Should it be ask'd whether this discovery (Investigation)† is a matter of mere curiosity or whether it tends to any beneficial purpose? I should answer, that, notwithstanding the happy effects of inoculation, with all the improvements which the practice has received since its introduction into this country, we sometimes observe it to prove fatal; & from this circumstance we feel, at all times, somewhat alarm'd for its consequences. But as fatal effects have been never known to arise from the Cowpox, even when impress'd in the most unfavorable manner, that is, when it has accidentally produc'd extensive inflammation, and suppurations on the hands; and as it clearly appears [43] that this disease leaves the Constitution in a state of perfect security from the infection of the smallpox, may we not infer that a mode of inoculation might be introduc'd, preferable to that at present adopted, especially among those families, which, from previous circumstances, we may judge to be predispos'd to have the disease unfavorably? It is an excess in the number of Pustules which we chiefly dread in the smallpox; but, in the Cowpox, no Pustules appear, nor does it seem possible for the contagious matter to produce the disease by effluvia or by any other means as I have before observ'd than *contact;* so that, a single Individual in a family might at any time receive it, without the risk of infecting the rest, or of spreading a disease that fills a country with Terror. [44] Without further research, I should therefore not in the least hesitate to inoculate Adults, and Children not very young, with the matter of Cowpox, in preference to common variolous matter. How far it may be admissible on the tender skins of Infants, further experiments must determine. I have no other scruples than such as arise from the darkish appearance of the edges of the incisions in the arm of the Boy whom I inoculated with this matter, the only experiment I had an opportunity of making in that way. But in this Case, the incisions tho perfectly superficial were made to a much greater extent than was necessary for communicating the infection to the system. However it proved of no [45] consequence, as the Arm never became painful, nor required any application.

I shall endeavor still further to prosecute this Inquiry, an Inquiry I trust, not merely speculative, but of sufficient moment to inspire the pleasing hope of its becoming essentially beneficial to Mankind.

† The word "Investigation" is written immediately above the word "discovery" in the MS.—ED. L.

The bronze group by Giulio Monteverde in the Wellcome Historical Medical Museum, representing Jenner performing the first vaccination on the boy James Phipps ("Case 13th" in the accompanying paper) on May 14th, 1796, with material taken from the hand of the dairymaid Sarah Nelmes, who had been infected with cow-pox. The group is sometimes erroneously referred to as "Jenner vaccinating his own child." Monteverde's rendering is, of course, purely imaginative; he never saw Jenner, and the boy Phipps was in reality eight years of age.

THE RAPID SPREAD OF VACCINATION.

The speed with which the knowledge of Jenner's work spread over Europe in the absence of any of the facilities with which we are now provided is very remarkable. In a Statement of the Progress in the Vaccine Inoculation, communicated to the *Medical and Physical Journal* for October, 1799, Dr. George Pearson, F.R.S., Physician to St. George's Hospital, writes:—

"Not much more than six months have elapsed since the opportunity was afforded, by the breaking out of the *vaccine disease* in two principal milch-farms near London, of obtaining matter for propagating the same disease among human creatures. The *new inoculation* was immediately introduced in London, and soon afterwards in the neighbourhood, as well as in many provincial situations. It is with sincere satisfaction that we can now reckon, at the fewest, 2000 persons who have passed through the cow-pox by inoculation. . . .

"The sensation excited on the continent by the vaccine inoculation has been much more considerable than even in our own island, as I learned first from Dr. Marcet, and since by a letter from Dr. Peschier. At Vienna, Dr. Ferro inoculated two of his own children with vaccine matter, which I transmitted; and next, Dr. De Carro inoculated two of his own children. An accurate journal of these two last cases was kept by Dr. De Carro, which he has had the complaisance to communicate to me through the hands of Dr. Peschier. The above patients had the vaccine disease in the usual mild way that they have had it in England, and were inoculated subsequently for the small-pox, but without taking that disease.

"It is expected that Dr. Frank will adopt the new inoculation, as it is likely to be generally done at Vienna.

"I expect reports from Portugal and other parts of the Continent. . . .

"In Scotland, the new inoculation has not been less successful. Dr. Anderson, of Leith, informs me, he has inoculated above 80 persons; that Dr. Duncan, and others, have begun the practice at Edinburgh; and that it has been introduced in Dundee, Paisley and Dalkieth.

"If the vaccine inoculation proceeds with equal mildness as it has done the last four months, doubtless the variolous incision must in no remote period be superseded. And if such an event should take place, posterity will behold with amazement the prejudices and inattention of their predecessors to the application of a fact in practice, by which a formidable and loathsome disease was extinguished—a fact well known, time immemorial, to almost every farmer in half a dozen counties of England, but neglected till Jenner had the courage to indicate the advantages of it to society. If I were to name a parallel instance of inattention or prejudice, it should be the neglect of inoculation for the small-pox till it was introduced into England from Constantinople, although it had been practised time immemorial in the Barozzo mountains, on the frontiers of Gallicia, in the same rude manner that it is at this day."

JENNER CENTENARY.

At 8.30 P.M. on Friday, Jan. 26th, the centenary of Jenner's death will be observed at the house of the Royal Society of Medicine, 1, Wimpole-street, London, W. 1, when Sir William Hale-White, President, will give an address on "Jenner and his Work." A portrait of Jenner in oil colours by Hobday, presented by Dr. W. S. A. Griffith, will be on view, and Mr. C. J. S. Thompson, of the Wellcome Historical Medical Museum, will show Jenner relics.

A commemorative exhibition of personal relics, medals, books, MSS., engravings, caricatures, and other objects connected with Jenner and his work, will be held at the Wellcome Museum, 54a, Wigmore-street, W. 1, and will remain open for some months, daily from 10 A.M. to 5 P.M. All members of the profession and others interested are invited to view this exhibition.

INDUSTRIAL ANTHRAX.

AN INTERNATIONAL LABOUR CONFERENCE.

THE Advisory Committee on Anthrax convened by the Third International Labour Conference met in London from Dec. 5th–14th last. The Comimttee, which was chosen to include experts of the countries importing and exporting wool, was composed as follows:—Australia, Sir Thomas Oliver; Belgium, Dr. Glibert; France, Mr. Boulin; Germany, Dr. Frey; Great Britain, Sir William Middlebrook (chairman of the Departmental Committee on Anthrax); Italy, Dr. Loriga; India, Colonel Hutchinson; Japan., Dr. Konai; South Africa, Dr. Dixon; Spain, Prof. Rocca; Sweden, Mr. Ribbing; observer for the United States, Dr. Dorset.

The Committee was charged with inquiring into the problem of the disinfection of wool and hair suspected of being infected by anthrax; the most practical and effective methods of preventing infection among flocks; and the possibilities of dealing with infection by anthrax from hides, skins, and other suspected animal products.

The preliminary work of the Advisory Committee was summarised in a report of the Industrial Hygiene Section of the International Labour Office containing information from 27 countries. The chairman of the Committee distributed a pamphlet containing a survey of the results obtained in England during the last few years.

Infection from Wool and Hair.

After long and lively discussion, it was resolved:—

1. That hair used in the brush-making and upholstering industries shall be disinfected before the materials are handled industrially.

2. That wool and hair to be used in the textile industry shall be disinfected before the materials are handled industrially, except in the following cases: (*a*) If the country of origin is included in the schedule of countries where the danger is slight; (*b*) if the material to be imported has already been disinfected by a process recognised as effective; (*c*) if wools and long hair have to be sorted before washing, unless these products are not included in the list of harmless products; (*d*) in such other cases as may be determined by the Committee.

The experts who had come to give evidence agreed that the proportion of wool imported into England which does not require sorting before washing is extremely small, and that it is almost always this kind of goods which gives rise to the danger of anthrax among the workers; that if it were technically possible to sort the wools after washing, it would be bad from the commercial point of view.

Anthrax Among Flocks.

The Committee was of opinion that the best precautions against the danger of anthrax among flocks are at the present time the following:—

Compulsory notification and official verification of cases of anthrax.

Isolation of animals suffering from or suspected of suffering from anthrax.

The destruction of the entire carcass of any animals dead of or suspected to have died of anthrax, and disinfection of the immediate surroundings of the place where the animal has died as well as of the premises where it has been kept.

Preventive inoculation of animals against anthrax.

The Committee decided that the International Labour Office would have to study thoroughly this question in conjunction with the International Institute of Agriculture in Rome in order to arrive at some practical conclusions of an international character.

In the case of horns and hoofs the disinfection appears to be an extremely simple matter in practice, as they generally have to be treated by boiling, in order to be used for industrial purposes. In the case of bones, the Committee admitted that the industrial treatment to which they are subjected is generally equivalent to a disinfecting process.

Resolution.

The Committee agreed to adopt the following resolution:—

"The Committee is of opinion that in most countries the principal danger of industrial anthrax arises in the manipulation of hides and skins, and recognises the impossibility of securing at the present time complete disinfection to protect against this danger.

The Committee, therefore, recommends that regulations be laid down in the different countries having for their object the protection of the workers and the soil against infection by anthrax from hides and skins.

The Committee further suggests that the International Labour Office, in conjunction with the Health Committee of the League of Nations, should organise international research and invite nations and organisations chiefly interested to undertake such research in their respective countries.

The Committee considers that in view of the fact that all countries using infected materials will benefit by the discovery of a satisfactory process of disinfection it is desirable that the governing body should take into consideration the possibility of finding grants in aid of research undertaken for that purpose."

The final report of the Committee was drawn up by Dr. Glibert (Belgium) and Mr. Ribbing (Sweden) and adopted unanimously with the exception of one abstention and two votes withheld on a point concerning wools.

DONATIONS AND BEQUESTS.—Mr. John Philip Garnett, accountant, Manchester, left £250 to the Manchester Royal Infirmary, £250 to the Ancoats Hospital, £250 to Salford Royal Hospital, and £250 to the Christie Cancer Hospital, Manchester. The Manchester Children's Hospital has received donations amounting to over £1580, including £750 from Messrs. Peel and Co., Ltd., £250 from Booth Charities, and £150 from Dickanson's Charity. From a sum of £2120 received last year in Radcliffe for charities by collection in the mills and workshops, there has been allotted to the medical charities of Manchester and Salford £820, to Bury Infirmary £462, Bolton Infirmary £97, and Southport Convalescent Home £159, and lesser grants to other institutions in the county. Mr. Rowland Lowe, of Grand Rapids, U.S.A., has given £2000 to endow beds at the Ashton-under-Lyne Infirmary in memory of his parents.

THE LANCET.

LONDON: SATURDAY, JANUARY 20, 1923.

WAR BLINDNESS.

THE number of combatants on the Western front in the late war who lost their sight appears to have been something like 10,000, and the methods adopted by the various countries in dealing with these unfortunates had much in common. Naturally there is local colour in the details. Dogs are used as blind guides in Germany, and blind stenographers have done better there than here; so much of difference may be gleaned from Captain IAN FRASER'S interesting comparison of British and German methods which we published in a recent issue.[1] The total number of men who passed through St. Dunstan's, blinded directly or indirectly as the result of the war, estimated up to 18 months after the armistice, was 1833. Of these, 825 were under the care of Sir ARNOLD LAWSON, the author of a book[2] which forms an important ophthalmological record of the war. The cases are analysed into various categories, a large number of short histories of the more interesting are given, and the book is completed by a chapter on disability pensions, and another on the plan of re-education adopted under the influence of Sir ARTHUR PEARSON at St. Dunstan's. Of the cases under Sir ARNOLD LAWSON'S care only slightly under one-half were directly due to wounds. Of these, 72, or 17 per cent., were caused by through-and-through bullet wounds. In many of these the destruction of the second eye was due to partial or complete severance of the optic nerve behind the eyeball, and a new point brought out is that it is possible to distinguish by the ophthalmoscopic appearance whether the injury to the nerve took place immediately or at some distance behind the eyeball.

The more important section of the book concerns the 417 cases of non-traumatic blindness. The analysis of these is prefaced by some general remarks. First, it is not advisable to accept for active service any man whose defective sight in both eyes is due to old inflammatory disease of the uveal tract. No matter how quiet the eyes may be, or for how long the disease has been stationary, old inflammatory mischief is always apt to recrudesce under conditions inimical to general health. Secondly, even when one eye only has been affected in the past it must be taken into account that the other is always to some extent liable to attack. From this point of view cases in which one eye has been blinded by traumatism are more favourable than those in which the cause is syphilis, gonorrhœa, or septic infection. Thirdly, if a careful ophthalmoscopic examination of every man had been made prior to enlistment a large number of cases of active disease, congenital or acquired, would have been excluded, and a large amount of money saved in invalidity pensions. This fact should be of importance in pressing for a better ophthalmoscopic education for medical students than exists at present. Fourthly, the author remarks on the appalling share which must be allotted to syphilis of the total number of cases of disease-blindness. In the chapter on disability pensions the gradual increase of the pension rates during the war is recorded, and also the work of Sir ARTHUR PEARSON on behalf of the appellants against unfavourable decisions of the tribunals. A large number of pensionless men gradually collected at St. Dunstan's. Appeals to the tribunals in 56 cases were successful in 48 instances. At first all unwounded cases of blindness due to syphilis, whether inherited or acquired, were refused pensions. It was largely owing to the strong advocacy of Sir ARNOLD LAWSON himself that this attitude was subsequently changed. As he pointed out to the tribunal in a test case, the large percentage of blindness due to syphilitic optic atrophy in young soldiers was altogether in excess of what occurs in a similar class of syphilitic patients in civil life. The facts point absolutely to the conclusion that a large number of blind syphilitics owe their blindness indirectly to their service on behalf of their country, and that had it not been for such service very many now blinded would be enjoying good sight. Again, no less than 28 of the blind men who come under the heading of non-traumatic blindness suffered from retinitis pigmentosa. Of course, this ought to have been diagnosed when they were examined on enlistment, and the first decisions of the medical boards rejected them for pensions on the ground that their blindness had nothing to do with army service. All these men, however, were blind before they had reached the age of 40 years, and nearly half before they had reached the age of 25. Comparing this with the average age at which blindness becomes complete in this disease, it is very plain that this sad condition of these men, if not caused was very much hastened by the conditions of war service, a fact which was recognised later on by the pension appeal tribunals.

In the final chapter of this book the difficulties, and also the successes, of the re-education methods of St. Dunstan's are set forth. The large proportion of success was due partly to the fact that at St. Dunstan's the men were still comparatively young, and that in the great majority of cases their blindness was nearly complete. When the patient is over middle age and where he still possesses a certain amount of useful sight, though insufficient for the purpose of earning a living, the problem is far more difficult of solution.

[1] THE LANCET, Jan. 6th, p. 44.

[2] War Blindness at St. Dunstan's. By Sir Arnold Lawson, K.B.E., M.D., F.R.C.S., Senior Ophthalmic Surgeon and Lecturer in Ophthalmic Surgery, Middlesex Hospital. Oxford Medical Publications. London: Henry Frowde and Hodder and Stoughton. 1922. Pp. 148. 7*s*. 6*d*.

ON DISCLAIMING.

WE printed last week a disclaimer by the medical author of a book, which had been designed solely for medical men, but which on its appearance received abundant notice in the daily press. We understand from the author that an interview, which did not take place at all, appeared in an evening paper, and he wished it to be known that he granted no interviews to journalists and that no copies of his book were forwarded to other than professional journals. We were glad to insert the disclaimer, although we doubted the need for doing so. No medical man, and certainly no colleague of the author's, supposed that he desired the kind of publicity which he obtained. This embarrassing notoriety was, we believe, entirely due to the chance coincidence that the book appeared shortly after a debate on surgical mistakes had taken place at the Royal Society of Medicine, from which representatives of the lay press, who wished to be present, were excluded. However much an author may regret unprovoked publicity, he is often entirely unable to prevent it, and this is a fact which gives renewed point to the comment which we recently felt

it necessary to make upon the debate on indirect advertisement at the General Medical Council. We then took as an example a well-known consultant, called in to the case of a public person, whose name appeared prominently on this account. In a letter to our columns this consultant justly indicated that the point of censure is not the fortuitous appearance of a doctor's name in the lay press, but neglect to do his utmost to prevent its appearance there. Neither in the case of physician to the well-known man, or in that of the book which has caught the popular eye, does the slightest question arise of oblique advertisement. The circumstances in which the name of a medical man comes prominently forward in the lay press are themselves the best clue to whether notoriety was obtained by the practitioner for himself or was thrust upon him. No disclaimer, whether in our own columns or elsewhere, can improve on the effect of a transparently honest case or do much to mitigate suspicion where the circumstances are equivocal. The increased interest which is being taken—and, we think, rightly taken—in medical matters by the lay press must result in a more frequent appearance of the names of individual medical men and women. For this reason we shall not in the future consider it necessary, apart from exceptional circumstances, to print such disclaimers as appear in our issues of Dec. 16th and Jan. 13th.

We contemplate ourselves without alarm the growing interest taken by the public press in medical matters, and we should hesitate to dictate the method of journalistic treatment of medical matters which naturally differs widely from that of a professional journal. The rapid news service of the lay press can be of great value in case of epidemic disease, and is freely utilised by sanitary officers and others. But the centre of interest waxes and wanes like a comet, and medical reports in the daily press, even where the papers are well-informed, lack the continuity of orderly discussion. This is not to say that so long as the interest lasts it may not be well directed. The Sunday paper which made most of the details of surgical mistakes, to the possible extent of alarming the public, ended with a reasonable and proper assurance: "The advent of this book," said the *Weekly Dispatch*, "whilst disturbing to the timid, should in reality reassure them. It makes it clear that with the vast majority of cases incorrect diagnosis or execution is the exception rather than the rule." Frankness breeds frankness, and it is well for the public to know that there are many other factors involved in the successful treatment of a particular case than the surgeon's individual skill. Promising medical careers have been before now tragically blighted by public misunderstanding of a fatal result in what appeared to be a promising case. Reports of inquests and police-court proceedings light up cases where medicine has failed, but without necessarily being in any way to blame for failure. Physicians and surgeons with reputation well established and with nothing to lose from candour are often willing to disclose to the world their early mistakes, glorified it may be by the lapse of time and the desire to tell a good story at their own expense. We have often regretted the absence from our own columns of recorded instances of failure in regard to methods of treatment which, by common knowledge, are not universally successful. Assurance of absolute candour on the part of the medical man in regard both to successes and failures would, we believe, raise in popular esteem the present-day methods of medical practice from which some of the mystery of a more credulous age has been rubbed away.

THE DUMPING OF REFUSE.

IN his last report on the health of Manchester Dr. JAMES NIVEN draws attention to the bad policy of tipping organic refuse within the city area. Mr. BERNARD SHAW'S amusing but perfectly serious letters concerning the dumping of London refuse near his country house in Hertfordshire raise the sanitary and ethical questions involved in fouling your neighbour's land. The dumping of refuse from London in the Home Counties periodically comes up for consideration and discussion, but we do not find that there is any abatement of the evil. Dumping is wrong in principle, as it is quite opposed to the interests of public health, and is uneconomical, although it may prove of agricultural value to the contractor who receives the refuse if, as is frequently the case, he is also a farmer. Refuse dumps, for some time after the refuse has been deposited, are a definite menace to public health. Included in the refuse is a considerable amount of old and discarded clothing, bed-clothing, pillows, and mattresses, and these are potentially a medium for the transmission of infectious disease. Dumps also provide an excellent breeding ground for rats and flies. The ætiological relationship between rats and certain diseases of man and animals is well known. As a carrier of the specific organism of certain diseases, the fly occupies a well-recognised position, and complaints are frequently received from people residing in the vicinity of large refuse dumps regarding the nuisance occasioned by large numbers of these pests. The firing of dumps not infrequently gives rise to a very disagreeable and irritating nuisance. Refuse dumps may be set on fire intentionally with a view to the destruction of organic and combustible material, but usually the firing is caused accidentally from the careless use of matches or from spontaneous combustion. Whatever the cause, the result is the production of acrid and irritating fumes, which, with a strong wind, are carried a considerable distance and may prove to be a source of considerable annoyance and irritation to people residing in the district. Combustion, however, is to some extent beneficial, as it destroys the organic matter upon which the presence of rats and flies depends, but once commenced it is very difficult to control and the dump may smoulder for an indefinite period. The Ministry of Health fully recognises the essential badness of disposal by tipping, and recently issued a circular to local authorities setting out how the nuisances may be, to some extent, prevented by careful management.

From the public health point of view the best method of dealing with the house refuse is by incineration in a destructor, and this method should not be beyond the means of any borough possessed of a respectable rateable value. Glasgow long ago washed its hands of slipshod and offensive methods. Up to the year 1868 house refuse lay about in open depots until it was carted away by the farmers. Now cremation of the refuse drives clinker crushing and screening plant and supplies hot water for baths and lavatories, while at the refuse despatch works a valuable fertiliser is produced known as "prepared city manure." A number of English boroughs have since followed this good example. But the disposal of refuse by dumping on the land unfortunately is likely to be continued in many districts for some time to come. To safeguard the interests of the public health and the amenities of pleasant country districts, Dr. H. H. THOMSON has recently suggested to the Hertfordshire County Council that the conditions under which house refuse is

conveyed and dumped in rural districts should be clearly defined. Three conditions are essential: (1) the conveyance of refuse in covered railway wagons; (2) the keeping of the surface of the dump level, and the covering of all refuse, new and old, with nine inches of soil; (3) permission from and supervision by the council of the county where refuse is deposited by an authority outside the county area. At present the local sanitary authority is responsible. The enormous amount of refuse which has to be dealt with from a city of the size of London raises the question of the possible commercial value of house refuse. If its immediate conversion into some commercially useful material could be made a practical proposition, an important problem in relation to public health would find a much-needed solution.

Annotations.

"Ne quid nimis."

THE HYGIENE OF LAUNDRY-WORK.

THE laundry trade has been one of the last industries to be factorialised, and even yet the customers of a laundry continue to be its keenest rivals. A rise in charges or depression in trade causes the washing to be done at home. In the past the conditions of laundries in cramped and unsuitable premises have been justly condemned; but modern laundries built for the purpose are economically so efficient that they are supplanting older premises. Nevertheless the trade still presents enormous diversity from a specially designed factory to some modified stable. An investigator aiming in such an industry at determining the effect exerted upon the workers of their work is faced with innumerable difficulties. Miss May Smith has essayed the task for the Industrial Fatigue Research Board, and a report[1] upon her inquiry is now published. First, an effort was made to study the workers at work by scientific observation. The time interval in performing given tasks was chosen as a measure; it was found to be longer during a day of ten hours' work than one of nine hours at different laundries and at different processes, and it lengthened as the end of the afternoon approached. No evidence, however, was obtained that fatigue accumulated from day to day, or that a reduction of hours increased the total output. Fatigue among the workers, so far as productivity is concerned, appears to be submerged in the question of efficient organisation, such as regulation of the supply of articles, placing well-matched girls to work together, or replacing involuntary and irregular stoppages by definite rest pauses, as, for instance, a ten-minute interval for tea. Details of accurate time measurements are given to justify these conclusions.

Workers were also studied by the psychological "dotting" test. Observations upon individual operatives showed that conditions of work and physical well-being actually have effects which can be measured, for performances at the test improved or deteriorated with such things as interesting or monotonous work, with healthy vitality or the presence of sick headaches. When the observations were grouped for workers at different processes the number of errors was found to be from 10 to 20 per cent. greater in the afternoon than in the morning; it was larger in later hours of the afternoon than in earlier; it was smallest on Tuesdays and Wednesdays, and largest on Thursdays and Fridays (Saturday being a half-day is excluded from the observations). Atmospheric conditions were investigated in a number of laundries by using the kata-thermometer. When these observations, which are given in detail, are compared with those collected in other trades, like potters' shops, boot and shoe factories, and weaving sheds, the air of laundries is found to have a low cooling power, too low to be physiologically stimulating. Improvement in this matter appears to be an insistent problem in laundries. We regret that no effort is reported to discover how activity is affected by the prevailing conditions. But the comparison here made with other industries is of great import; it demonstrates how the research work of the Board increases in value as industry after industry comes under review. Miss Smith, after discussing the scientific data collected, makes common-sense observations upon matters which cannot be submitted to accurate measurement. Attention is drawn to unnecessary irritation to workers caused by defective organisation within particular processes, or by unsympathetic forewomen who command no loyalty; to the advantage of changing occupations in order to escape from long repetition of some wearisome movement, such as back-bending; to the need for seats during temporary lulls in work; to the mistake of allowing girls who are on their feet all day to wear shoes with narrow toes and high heels instead of strong Lancashire clogs; to the urgent call for adapting machines to workers and not leaving manufacturers to supply what seems to them appropriate; and to the existence of monotony fatigue, that type which says, "I'm not tired, but I'm tired of this."

The report throughout gains much from the way in which the personality of the workers is permitted to appear; it is more than an exposition of a scientific research; it is a very human document.

[1] Some Studies in the Laundry Trade. By May Smith. Industrial Fatigue Research Board. Report No. 22. 1922.

EARLY PHLEBITIS IN PULMONARY TUBERCULOSIS.

Prof. Lafforgue,[1] of the Toulouse Faculty of Medicine, remarks that the mention of phlebitis in pulmonary tuberculosis usually suggests the phlegmasia which occurs at an advanced stage of the disease, whether associated or not with cachexia. This form of phlebitis, of which a classical description has been given by Vaquez and Widal, is by far the most frequent, whereas comparatively little is known of the phlebitis which appears in the early stage of pulmonary tuberculosis. In the course of his long career Prof. Lafforgue has seen only two examples of this early form and barely 20 cases have been recorded in French literature. Some well-known authorities such as Laveran have even denied its existence. The first important description of early tuberculous phlebitis appears to have been given by Hirtz at a meeting of the Medical Society of the Paris Hospitals in 1894, since when several Paris theses have been devoted to the subject. The complication may develop in the following distinct types of tuberculosis. The first type is composed of persons who are free from any obvious symptoms of tuberculosis, though on close examination evidence of the disease will be detected in the lymphatic glands, especially the tracheo-bronchial group, the hila or apices of the lungs, or in the pleura. The second group consists of persons in the initial stage with slight but definite signs in the lungs. The third type is represented by sero-fibrinous pleurisy, and the fourth by an abnormal form of tuberculosis simulating chlorosis. Early phlebitis shows a marked predilection for the lower limbs affecting each with equal frequency. As a rule it is unilateral, but occasionally it involves both sides, either simultaneously or much more frequently one side 10 or 20 days before the other. The superficial veins are principally involved, the internal saphenous in half, and the external saphenous in one-fifth of the cases. The femoral is occasionally affected, either primarily or by spread of inflammation from the saphena, but much less frequently than is estimated by some statistics. The onset is usually gradual, being characterised by pain which, as a rule, is moderate but progressive in character, and is followed from a few days to a week later by œdema, which is

[1] Paris Médical, Jan. 6th, 1923.

always of slight extent unless the femoral is involved, when it is more pronounced and persistent. In the neighbourhood of the œdematous area, and usually above it, the thrombosed segment of the vein can be felt. The rise of temperature is usually slight and transient and is not accompanied by shiverlng or constitutional disturbance except in phlebitis of the deep veins, when a temperature of 104° F. may be registered. Early tuberculous phlebitis is further characterised by absence of a collateral circulation, very slight impairment of function, and absence of cutaneous sensory changes or of trophic or vaso-motor disturbances which are found in other varieties of phlebitis. As regards the diagnosis, apart from the exceptional cases in which the phlebitis is unilateral, there is little chance of the œdema being mistaken for that due to cardiac or renal disease or mechanical causes. But when pain is the principal feature and the other symptoms are in abeyance, the phlebitis may be mistaken for peripheral neuritis or arthritis. When once the diagnosis of phlebitis is established its nature must be determined, and such causes as chlorosis, rheumatism, gout, gonorrhœa, typhoid, and especially syphilis must be excluded. The immediate prognosis of early phlebitis is favourable, especially as there is no likelihood of embolism. On the other hand, the remote prognosis is often very grave and should always be guarded. In about one-third of the cases acute generalised tuberculosis ensues at any time from a few months to two years from the appearance of the phlebitis. In about the same proportion of cases in place of an acute generalised tuberculosis there is a marked aggravation of the initial lesions and a more or less rapidly fatal issue takes place. It is only in a few instances that the pulmonary lesions remain stationary. The treatment does not differ from that of other forms of phlebitis. In spite of the rarity of embolism it is advisable to immobilise the limb until the acute symptoms have subsided, and in view of the likelihood of acute tuberculosis appropriate measures should be adopted.

THE APOTHECARIES' GARDEN AT CHELSEA.

THERE is a passage in the Agricola where Tacitus adjures his father-in-law with that "organ voice" which he possessed in common with Milton; "Si quis piorum manibus locus, si, ut sapientibus placet, non cum corpore extinguuntur magnæ animæ, placide quiescas. . . ." The spirits of bygone apothecaries, of Sir Thomas More, of Sir Hans Sloane, of Linnæus, and many another botanist and physician might well be gladdened by a recently published account of the apothecaries' garden at Chelsea by Dr. F. Dawtrey Drewitt.[1] The Physic Garden at Chelsea is now safe, in so far as anything may be safe in these days of unrest, from the builder and the kinema company monger, and we may reasonably hope will remain as an oasis in the desert of houses and a place where students of nature may study. For the detailed history of the garden we must refer readers to Dr. Drewitt's book, but briefly it began its existence in 1673 when the Apothecaries' Company which had separated from the Grocers' by order of James I. in 1617, feeling the need of a garden where they could "cultivate rare plants, and sow seeds now coming in from foreign lands" leased three acres of land from Charles Cheyne, afterwards Lord Cheyne, for £5 per annum, in the then riverside village of Chelsea. From the first there were difficulties in finding money for the upkeep, and although early in the eighteenth century Lord Cheyne had offered the Company the freehold for £400, this was a sum far beyond their means. In 1713 the Company were hard pressed, but by the sale of some South Sea Stock "with advantage," and by a tax on masters and apprentices, they managed to keep the garden going. But in 1712 Sir Hans Sloane had bought the Manor of Chelsea, so that he was now the Apothecaries' landlord, and him they consulted in their trouble. Being a just as well 1722 a deed was signed by which Sloane undertook in as a learned man, he heard their complaint, and in consideration of a yearly rent of £5 to convey the Physic Garden to the Company for ever, together with its stoves, green-houses and barge-houses, to enable the Society to support the charge thereof, "for the manifestation of the power, wisdom, and glory of God in the works of creation and to show how useful plants may be distinguished from those that are hurtful." So matters went on until the year 1893, when the Apothecaries' Company reluctantly decided that they could no longer bear the expense of keeping up the garden. Neither the Royal Society nor the Royal College of Physicians of London would accept the reversion of the garden, so the Apothecaries handed it over to the Charity Commissioners. By Sir Hans Sloane's will the garden reverted to his heirs so soon as it should cease to be used for scientific purposes, so there was every prospect of the site being used for building. In this crisis Lord Meath, the Director of Kew Gardens (Sir W. Thiselton Dyer), and others urged upon the Treasury that the garden was of importance to all students of botany, and eventually a committee was appointed to superintend its management, the members of which are appointed by or represent the London Parochial Charities, the Treasury, the London County Council, the Royal College of Physicians, and other bodies. Income for upkeep comes from the London Charities, the Royal College of Physicians, London University, and other bodies. Dr. Drewitt's pages teem with information about the history of the garden, its curators, its distinguished visitors, its trees and plants, and the "herborising" excursions which the demonstrator and the apprentices of the Apothecaries' Company carried out. These continued until the "fifties" of the last century, and an amusing account of them will be found in one of Albert Smith's now forgotten novels.

[1] The Romance of the Apothecaries' Garden at Chelsea. By F. Dawtrey Drewitt, M.A., M.D., F.R.C.P. Lond.

THE BLOOD AND CANCER RESEARCH.

THE problems of cancer, so fascinating in their complexity, obstinately resist the attack of the research worker to the extent that it is a matter for wonder that men can be found willing to devote their lives to them. The chances of reaping a just reward for prolonged conscientious and often exceedingly arduous work are indeed remote; more often the end attained is only the blocking of a further avenue of research for subsequent investigators. Yet there is consolation in the fact that though the secrets of malignant growth are revealed so grudgingly, inroads into this field of knowledge are surely, if slowly, being made. Some recent work[1] by J. B. Murphy and E. Sturn on the conditions of growth of heteroplastic tumour tissue in brain substance, seems to show that such growth is possible only because foreign body reaction changes do not take place around the grafts, as they do when inoculation is performed subcutaneously. Lymphocytes appear to take a very active part in the destruction of this foreign tissue. Growth is also prevented, if a portion of the animal's own spleen be introduced into the brain with the alien tumour tissue. Previous researches by J. B. Murphy,[2] had established two other facts: (1) that foreign tumours can be carried through several generations in irradiated animals; and (2) that adult animals deprived of a large portion of lymphoid tissue are also deprived of their ability to destroy foreign tissue. The profound changes in the leucocytes found in X ray workers and their susceptibility to malignant disease are well known, whilst massive deep radiation for the cure of cancer is on its trial. It is interesting to speculate in view of the violent constitutional reactions which take place, and the pronounced changes which occur in the blood as a result of exposure of the body to X rays, whether the

[1] Journal of the American Medical Association, 1922, lxxix., 2159. [2] Journal of Experimental Medicine, 1914, xix., 513.

results claimed to be got by deep radiation could not equally well be obtained by the intense radiation of the spleen, and perhaps of the bone marrow, and whether the origin of malignant disease may not be related with some waning physiological powers of the lymphocytes, even if their numbers remain the same. We know little indeed of the properties and activities of these elements of the blood. It looks as though another field of research had been thrown open.

SHOULD TREATMENT FOR ULCERS OF THE STOMACH AND DUODENUM BE MEDICAL OR SURGICAL?

BEFORE this question can be answered satisfactorily, reliable answers to a number of other questions are required. Indeed, the whole subject bristles with question marks, which emphasise our lack of reliable data. At present we cannot even approximately estimate the chances of fatal complications when no operation is performed, nor can we say how often, and in which cases, skilled medical treatment effects a permanent recovery. How frequently, and to what extent are the patient's health and working capacity reduced by ulcer symptoms, and what are the end-results of surgical treatment? The three complications which, more than any other, have swept cases of gastric and duodenal ulcer out of the hands of the physician into those of the surgeon are malignant degeneration, fatal hæmorrhage, and perforation. A few months ago Dr. N. A. Nielsen[1] of Copenhagen, showed in a masterly review of the subject that the chances of malignant degeneration of gastric and duodenal ulcers have been much exaggerated, and his researches suggest that, though malignant disease of the stomach and duodenum often masquerades for a time as simple ulcer, it is comparatively seldom the final stage of chronic ulceration. In a more recent publication[2] he has dealt with the chances of ulceration of the stomach and duodenum terminating in fatal hæmorrhage, and the prospects of aborting this issue by operative interference. As his analysis of the large material at his disposal at the Rigshospital in Copenhagen indicates, fatal hæmorrhage is not only comparatively rare, but it also shows a remarkable tendency to attack persons who have previously shown slight or no symptoms beforehand. And if there had been slight symptoms beforehand, they had lasted only a short period. Obviously in these cases, even the discussion of an operation as a prophylactic measure against fatal hæmorrhage is unthinkable, considering how common are slight and transitory digestive disturbances. Dr. Nielsen has collected 55 cases of fatal hæmorrhage, observed between 1907 and 1917 in Copenhagen, and the post-mortem records showed that in 16 cases the fatal hæmorrhage came from a recent ulcer or erosion, and in 11 other cases the source of the hæmorrhage was also a recent ulcer, although other, old ulcers, were also found. In seven cases the post-mortem records were incomplete, and only in 21 cases did the fatal hæmorrhage come from a chronic ulcer. Most of the 27 patients who died of hæmorrhage from a recent ulcer were elderly; the age of 20 of the patients was between 40 and 76. The quasi-paradoxical conclusion to which Dr. Nielsen comes is that though only about a quarter of all the ulcers of the stomach and duodenum develop after the fortieth year, yet about three-quarters of all the fatal hæmorrhages from recent ulcers occur in patients who have passed the fortieth year. No doubt the capacity of a bleeding artery in this region to contract diminishes with age, and this is Dr. Nielsen's solution to his paradox. He has traced 182 patients, discharged from hospital two and a half to 19 years earlier, the diagnosis of gastric or duodenal ulcer during their residence in hospital being of a searching and reliable character. The treatment given in hospital was strictly medical. His investigations showed that 42 had subsequently been operated on, but in no case was the operation for severe hæmorrhage or free perforation. Of the remaining 140 patients, 16 were found to have died, but only in two cases was death due to hæmorrhage, and in none was it due to free perforation. Hence Dr. Nielsen's conclusion that the surgeon is hardly justified in recommending operative treatment to patients suffering from gastric and duodenal ulcer merely on the ground that they may possibly die of hæmorrhage.

[1] Acta Chir. Scand., 1922, lv., 57.
[2] Ibid., 1922, lv., 105.

RUSSIAN EPIDEMIOLOGISTS IN CONFERENCE.

THE sixth All-Russian Congress of Bacteriologists and Epidemiologists was held at Moscow last May. It is the only scientific Russian congress which has met every year since the revolution, and it is allowed to meet as the need for it is always felt since epidemics are continually sweeping through Russia. Only meagre accounts of this congress have been as yet available, but a good account is now given by Prof. P. Mühlens, of Hamburg, in the *Archiv für Schiffs- und Tropen-Hygiene* (xxvi., 8). Four hundred Russian doctors were gathered in from all parts of the country, and with them the members of the German Sanitary Commission. Gratitude was expressed to the foreign missions for their help, the problems of these diseases being felt to be too great to be solved by the unaided efforts of Russia herself. Typhus, which had been decreasing, began to spread itself more widely as soon as the famine conditions became acute, in the winter of 1921. It was most prevalent in the Volga provinces, and it spread chiefly from the hospitals and along the lines of the railways, whose staffs suffered heavily, and particularly the doctors. Prof. Barykin, of Moscow, reported that he had found the causal organism. Nothing is said of an accepted and effective method of treatment of the disease. Relapsing fever was treated best by neosalvarsan on the fifth day of the interval. Dr. E. I. Marzinowsky, director of the Moscow Institute of Tropical Diseases, wrote describing the development of the spirillum as he had seen it. Relapsing fever in Russia is often associated, in a novel syndrome, with a paratyphoid fever, caused by yet another *Bacillus paratyphosus*; this syndrome has a 50 per cent. mortality and is reported also from Poland, Rumania, and Asia Minor. Malaria has enormously increased in these later years and is extending itself farther and farther to the north. The congress was very anxious about this widening of the area in which malaria is become endemic, asking for better statistics, more information about the migration of mosquitoes; asking that infected troops and civilians shall be excluded from districts hitherto immune; asking for special antimalarial centres all over the country, under supervision of the Moscow Tropical Medicine Institute, and staffed by specialists; asking for schemes for drainage of swamps, and for more information about the winter epidemics of malaria, which specially attack men who are cutting turf. Plague was giving great anxiety in south and south-east. Leprosy was spreading so extensively that leper colonies are required with accurate registers of patients, and with schools and hospitals. Three thousand cases of cholera had appeared before the middle of May, thrice as many as in 1921. In the winter it was not water-borne, but had spread by personal contact. Preventive inoculation was recommended—starving people can only stand small preventive doses—though many carriers are found among the inoculated. The final resolution asserted that the famine area was far larger than the official reports admitted; that the famine was a chief cause of the prevalence of the epidemics, and that the assistance for the distressed obtainable within Russia herself was quite insufficient for her needs. In consequence the congress begged for help from Western Europe and from America. "The very richest of our districts are becoming deserts. Our cities and villages are dying out. Forty millions are starving. The condition of Russia is a menace to Europe, so we beg all professional and sanitary organisations in Europe and America to come to our aid." Delay in report of this congress

is the less material as conditions in Russia in regard to famine and pestilence are much the same as they were eight months ago.

CINCHONA FEBRIFUGE.

IN his annual report for 1921 of the Institute for Medical Research, Kuala Lumpur, Federated Malay States, a section is devoted by Dr. William Fletcher to a discussion of the merits of cinchona febrifuge in the treatment of malaria. Cinchona bark was brought to Europe in 1638, and a decoction was used empirically for the treatment of ague for nearly 200 years before its active principle was isolated, and only of comparatively recent times has the exclusive employment of one of its alkaloids—quinine—become customary. The report recalls Major H. W. Acton's experiments carried out at the British Malaria Convalescent Depôt at Dagshai, in the Himalayas, suggesting strongly that the mixed alkaloids are less toxic than quinine, and superior to it in the treatment of tertian ague. At Dagshai there was no chance of reinfection with malaria; Major Acton's patients were all soldiers, who were kept under observation for eight weeks after they had finished their course of treatment. The preparation used was cinchona febrifuge, containing the total alkaloids of cinchona bark, made at the Government quinine factories at Mungpoo, in India. The average composition of cinchona febrifuge is as follows: Crystallisable alkaloids (54·65 per cent.), quinine 7·40, quinidine 22·83, cinchonine 18·58, cinchonidine 5·84 per cent.; uncrystallisable alkaloids, ash, &c., 45·35 per cent. It is estimated that nearly 20,000 lb. of quinine are imported annually into British Malaya; quinine costs at least $28 a pound, whereas cinchona febrifuge costs less than $7 a pound, so that an enormous saving would be effected by the substitution of the unseparated mixture for general use. In the light of Major Acton's findings, Dr. Fletcher undertook experiments at Kuala Lumpur, where, however, the question of permanent cure was difficult to investigate—first, because patients might there become reinfected whilst under observation after the conclusion of treatment, and, secondly, because it was impossible to persuade patients to remain in hospital for two months after they had completed a four weeks' course of treatment. Only a small amount of the Indian cinchona febrifuge was available; its immediate effects upon malaria were found to be as powerful as those of quinine.

Another preparation containing the total alkaloids derived from Javan cinchona bark, also sold under the name of cinchona febrifuge, is made by the Bandœngsche Kininefabriek Company. The average composition is stated by the makers to be as follows: Crystallisable alkaloids (62·8 per cent.), quinine 11·5, quinidine 5·0, cinchonine 26·3, cinchonidine 20·0; uncrystallisable alkaloids, ash, &c., 37·2 per cent. A quantity of this Javan preparation was obtained and tested upon a small number of patients suffering from quartan malaria, which form of the disease is more rare, and probably more liable to relapses, than the tertian fevers; the number of patients, 23, was kept small in order to facilitate strict personal supervision of the treatment. These 23 patients were given 10 gr. cinchona febrifuge twice a day for four weeks in cylindrical gelatin capsules (number 0); an average of 21 ordinary and 13 thick blood films were examined during the four weeks of treatment in each case. Fifteen of the patients were suffering from quartan malaria, and the remainder from malignant or benign tertian, or mixed quartan and tertian malaria. In every case administration of cinchona febrifuge stopped the fever before the fifth day of treatment, and caused the disappearance of the parasites, although in three quartan cases the latter were found in ordinary films up to the fifth, sixth, and seventh days respectively, whilst in one case they were found in thick films as late as the eleventh day, but not subsequently. The immediate effect of the febrifuge was thus found to be equal to that of quinine. Sixteen patients were willing to remain in hospital for three weeks after the conclusion of their treatment; although from the statements of Acton and Stephens at least 10 of the 16 patients might have been expected to develop fever during these three weeks of observation, only four did in fact do so, and of these four two were probably fresh infections. It was therefore concluded that the permanent therapeutic effects of the Javan cinchona febrifuge are at least as good as those of quinine; and its toxicity was found to be no greater than quinine toxicity. Dr. Fletcher closes this section of his report with a warning to the effect that cinchona febrifuge is not an official drug, and that until its composition has been legally defined, powders deficient in alkaloids, or containing harmful alkaloids, may be sold under that name.

THE "WEEKLY RETURN."

WE remind our readers of the Weekly Return of Births and Deaths issued by the Registrar-General, which has just entered on its second year of publication in a new and attractive form. Table I. shows the births and deaths each week in the 105 great towns, with the numbers of fatal cases of fevers and the deaths of infants under 1 year of age. Table II. gives the same information for certain cities in the British commonwealth of nations and in foreign countries. Table III. classifies in greater detail the causes of deaths occurring in London. Table IV. sets out the notified cases of infectious diseases throughout the sanitary areas of the country. Table V. gives a conspectus of notified cases and deaths from certain important infectious diseases for each week in the preceding quarter. Tables VI. and VII. are meteorological. During the week ended Jan. 6th there were notified, in the whole of England and Wales, 12 cases of small-pox, 2269 of scarlet fever, 1063 of diphtheria, 43 of enteric fever, 968 of pneumonia, 124 of ophthalmia neonatorum, 46 of puerperal fever, and 13 of encephalitis lethargica. Of the less frequent infections there were notified 9 cases of dysentery, 7 of cerebro-spinal fever, 3 of acute poliomyelitis, and one each of acute polio-encephalitis and "continued fever." Table IV. makes it readily possible for anyone to ascertain at a glance the distribution of these infectious diseases throughout the various urban and rural districts of England and Wales. Table II., with its information regarding the cities of the British Empire and foreign countries, gives a graphic picture from week to week of the public health and social conditions prevailing throughout the world. The price of the Weekly Return is 1s. a copy. It is published by the Stationery Office and may be obtained through any bookseller. Its perusal will well repay the cost.

PROPOSED TESTIMONIAL TO DR. BYROM BRAMWELL.

THE news that Dr. Byrom Bramwell of Edinburgh has attained his seventy-fifth birthday and that it is proposed to mark the occasion by the presentation to him of an appropriate testimonial will be welcomed by all old Edinburgh students, as well as by many others of the profession who know him personally, or through his contributions to scientific medicine. For many years Dr. Bramwell, together with several other physicians now, unfortunately, no longer surviving, carried the reputation of the Edinburgh school, on the medical side, to a level which, if we are to take world-wide appreciation as a criterion, has not been equalled before or since. When these men were in their prime no school could boast a finer galaxy of scientific stars. Only Dr. Bramwell remains to-day, and if his working days are over no one who ever laboured with him, or was taught by him, is likely to forget the association with one in whom has

been combined the breadth of knowledge of the savant with the practical equipment of the bedside physician. Sometimes men who "sit under" such a teacher are too near him for due recognition of his great qualities; the lapse of time and the added factor of distance serve to bring into their true proportions the bigness, and the enduring influence, of the mind which can awaken in others the love of knowledge for its own sake, which can mould to the best purpose the impressionable character of the eager aspirant at the outset of his chosen career. The Provisional Committee for this testimonial is headed by the names of the leaders of the profession in this country—a sufficient indication of the respect and admiration with which Dr. Bramwell is regarded. Comparatively little public recognition of the honoured place Dr. Bramwell holds in the profession has fallen to his share during a long and active life; it is the more desirable, therefore, that in the days of his retirement all who have come in contact with him in any way should unite to put on record and to convey to him by suitable means their appreciation of his worth as a great physician, a great teacher, and a great gentleman.

THE RELATIONSHIP OF MEDICINE AND TOXICOLOGY.

IN the Presidential Address delivered to the Harveian Society on Jan. 11th Sir William Willcox outlined the modern conception of disease brought about by the discoveries of Pasteur and passed in review the development of medicine and toxicology side by side from the earliest known records in Babylon in 4000 to 3000 B.C. The ancient Egyptians possessed a profound knowledge of drugs and their actions, and they developed elaborate public health measures, even including meat inspection. This knowledge culminated in the Alexandrian School (B.C. 330 to 100). Medicine in Rome, until the influence of the Grecian School of Medicine became felt, was based chiefly on superstition. From this period, through the Middle Ages down almost to Harvey's time, practically no progress was made, medical knowledge remaining at a standstill. From 1615, when the discovery of the circulation of the blood was made, knowledge increased by leaps and bounds, the names of Sydenham, the two Hunters, Jenner, and Laennec were mentioned as landmarks, but it was left to Pasteur to demonstrate the causation of disease and to develop methods of immunity, and to Lord Lister to apply these principles to surgery. The history of toxicology might similarly be traced back to the Egyptians who were certainly familiar with the preparation of hydrocyanic acid from peach leaves and kernels, and with its poisonous properties. The writings of Homer gave a clue to the origin of the word "Toxicology" from τόξον a bow, for Ulysses sought to obtain from Ephyra a poison with which to anoint his arrows. Mithridates, King of Pontus, studied toxicology very deeply, using condemned criminals for experiments. He wrote a book on the subject and invented a universal antidote containing 36 ingredients. Hemlock was used by the Greeks, Socrates dying from its effects. Criminal poisoning was well known in Rome and legislative enactments dealt with this crime and also with the use of poisons to procure abortion. In the Renaissance period poisoning became a fine art, Cæsar Borgia, and Catherine de Medici being well-known exponents. At this period white arsenic and corrosive sublimate were by far the commonest poisons used. Neither medicine nor toxicology made great advance until chemistry and its application in the laboratory to the various problems had sufficiently developed to enable analytical problems to be undertaken. In 1836 the Marsh test was discovered; in 1839 arsenic was detected in all the organs in a case of acute arsenical poisoning by Orfila, and thus the importance of absorption of poisons was for the first time appreciated. In 1844 Fresenius and von Babo devised a method for systematic search for mineral poisons, and in 1850 Stas elaborated a process for the extraction of alkaloidal poisons. With slight modifications these methods stand to-day. Sir William Willcox referred to a number of cases of criminal poisoning, each showing some point of interest in the development of toxicology; among these the trial and conviction of Palmer in 1856 was important, for although the prosecution from clinical and other evidence believed that the victim, Cook, died of strychnine poisoning, this alkaloid was never found in the viscera, and on the evidence a conviction would hardly be obtained to-day. The Lamson case was of interest, for here the poison aconitine was demonstrated by physiological experiment on mice, there being no satisfactory chemical test. Finally, in the Black case in 1922, where the amount of the poison arsenic found was extremely small—less, in fact, than a possible fatal dose—knowledge of the approximate date of the administration and the average rate of excretion made it possible to show that a large dose of arsenic must have been administered.

THE DOCTOR'S TELEPHONE.

THE claim, recently made by Mr. J. M. Keynes, that an etiquette of the telephone should be recognised in order to protect busy men from its too common incivilities, will appeal strongly to medical men. The calling-up of the doctor on the 'phone should be limited to urgent cases. That is the obvious principle, but there are so many degrees of urgency that it would be difficult to lay down any strict rule. The shrewdness and tact of a confidential servant may save his master much time and annoyance, but nowadays many medical men lack this first line of defence. The drawbacks of the telephone as a bearer of important messages are very real. Complaints heard by insurance committees have been known to turn upon a call. Misunderstanding and misinterpretation of doctors' instructions are common, and, apart from the dictaphone, it is not an easy matter to get a correctly transmitted copy of a telephone conversation. We do not know precisely why the doctors of Coalville have decided, as we learn from a Leicestershire correspondent, to give up their 'phones, but the decision was apparently taken on account of unreasonable demands made by patients who were unwilling to write a message or send a messenger. In the case of insurance practice the telephone may lead to fraudulent demands for free treatment from persons who claim to be insured persons, but have no medical card. A contemporary asks: "Is it permissible for a doctor to give up his telephone and tell his patients that they must send for him?" There was a time when a doctor could conduct his practice in any way he chose, provided he observed professional customs and traditions. Recent regulations have altered the position to some extent for insurance practice. Doctors on the panel who live away from their surgeries are required to set up telephonic communication with their private houses so as to be readily accessible out of surgery hours. It seems a short step to the position of requiring the insurance practitioner to provide a telephone at his house. The friendly societies would have it so.

THE death is announced after a long illness, of Mr. H. P. Symonds at Oxford, and of Prof. Johannes Orth, successor of Virchow at the Berlin Pathological Institute.

Sir E. Sharpey Schafer has accepted the invitation to be the first Horsley Memorial lecturer. The lecture will probably be delivered in the autumn.

INDEX TO "THE LANCET," VOL. II., 1922.

THE Index and Title-page to Vol. II., 1922, which was completed with the issue of Dec. 30th, is now ready. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

III.

THE TREATMENT OF NEURALGIAS OF THE HEAD AND NECK.

ONE of the commonest difficulties in practice is the successful treatment of neuralgic pains about the head, and neck, and face. The primary and chief difficulty is the correct diagnosis of the source of the mischief, and it is highly important not to miss the recognition of organic causes of trouble which, by correct early treatment, might be cured, and to avoid the too facile temptation to the busy practitioner to assume a minor ailment and to order aspirin and other analgesics, while hoping for the best.

Dental Neuralgia.

Dental neuralgia is naturally one of the commonest, while one of the most acutely painful forms. Exposed dentine from wearing through the enamel by the hook support of a denture is a not unfrequent source of aching pain, sometimes of so fierce a nature that it has been mistaken for grave trigeminal neuralgia. A carious cavity in a tooth, especially if irritated by sweet food, often causes agonising pain. Before expert dental advice can be obtained in such cases it is a valuable help to be able to relieve the patient's sufferings, which can almost certainly be done in a few moments, after gently cleaning out the tooth cavity, by the application of a wad of cotton-wool steeped in a solution of equal parts of menthol, carbolic acid, and oil of cloves. Indeed, a useful household remedy is a small bottle containing a drachm each of these three ingredients. It is easily applied by twisting a wisp of cotton-wool round the wooden end of a match. Another dental neuralgia more difficult to relieve is an acute infection of the periodontal membrane, in which the tooth as a whole is tender and "stands on end." If no dental assistance is available, it may be possible to arrest the pain by salicyl ionisation of the side of the face. Painting the gum with iodine is commonly ordered for this complaint, but I have never known it do the slightest good. The pain may be so fierce that morphia injection may be necessary, and often nothing short of extraction of the tooth gives relief. In obscure cases of persistent neuralgic pain of the jaws X ray films of the jaws and teeth should be taken, as impacted or unerupted teeth or other gross disease of the bone may thus be demonstrated as the cause.

Antral Abscess.

Antral abscess may usually be demonstrated by X rays or by transillumination, the pain at first limited to the region of the cheek and upper jaw, sometimes over the whole territory of the fifth nerve on that side, and down the neck even into the arm and fingers. A carious last lower molar often gives rise to pain in the ear and neck, the pain, too, being referred even down the arm. It is important to remember that though a dental neuralgia may give rise to pain reflected over other areas on the same side of the face and neck, yet the neuralgia never crosses to the opposite side of the face. Hyperæsthesia of the skin is common in these neuralgias, but if on examination definite anæsthesia of the upper or lower lip or cheek is found, this is at once evidence, in a patient who has never been operated on or injected for the neuralgia, that some gross disease, such as a gumma or a malignant growth, is damaging the fifth nerve or one of its main branches. Syphilitic neuralgias of the fifth nerve are usually very amenable to suitable treatment, but malignant growths of the upper jaw or tonsillar region are extremely difficult to relieve. Occasionally alcohol injection of the Gasserian ganglion may arrest the pain in inoperable growths of the upper jaw or in recurrent epithelioma of the tongue and lower jaw.

Paroxysmal Trigeminal Neuralgia.

True paroxysmal trigeminal neuralgia in its early stages is often difficult to distinguish from some of the local causes of pain already referred to, but the characteristic hot flashes of pain started by movements of the lips or jaws or by light touches on the cheek, especially when the pain has recurred at intervals for months or years, will decide the diagnosis. Treatment by carefully applied salicyl ionisation to the side of the face, using thick pads, sometimes gives great relief; in others the administration of thyroid extract internally, or tincture of gelsemium in full doses with butyl chloral hydrate may arrest the paroxysms. Change of climate is of little value, and in obstinate cases which resist the treatments described recourse should be had to alcohol injection of the nerve trunks or of the Gasserian ganglion before considering the major operation for resection of the sensory root of the fifth nerve within the skull. Repeated injections of morphia and heroin should never be employed, as little relief is obtained, and the habit once established is very difficult to eradicate.

Supra-orbital Neuralgia.

Supra-orbital neuralgia, when not migrainous or due to sinus inflammation, may be a post-febrile perineuritis following influenza, malaria, or even a common cold. There is usually tenderness over the supra-orbital notch, and the pain is often periodic, coming on about 11 A.M. and lasting until 5 P.M. I have, however, seen the same periodicity with pain in the cheek due to antral abscess. Hypodermic injections of morphia given on three successive days an hour before the usual onset of the pain may cure the condition, but sometimes the vomiting induced by the morphia aggravates the pain. Rest and analgesics, such as pyramidon and caffeine, with salicylate of soda, will cure other cases, but in some cases the pain is inveterate and may persist for many years. It may then be relieved by alcohol injection at the supra-orbital notch or by resection of a piece of the nerve itself.

Post-herpetic Frontal Neuralgia.

Post-herpetic frontal neuralgia is occasionally a troublesome sequel of frontal or ophthalmic herpes. Usually the persistent abnormal sensations amount to no more than formication, numbness, and a sense of constriction, but sometimes neuralgic pains are severe. Sedatives as bromide, aspirin, and other analgesics may give some relief, but the condition is difficult to cure, though usually it subsides gradually after a few weeks or months. If the pain is very severe and persistent, it may be advisable to destroy the Gasserian ganglion by alcohol injection or to resect the sensory root.

Migrainous Neuralgia.

Migrainous neuralgia is a form of migraine in which the pain is localised in the temple, or it may spread anteriorly into the upper part of the face. It resembles migraine in its periodicity, and is accompanied by nausea, but is rarely preceded by visual scotomata. The pain is liable to be mistaken for trigeminal neuralgia, but should never be treated by alcohol injection. Aspirin, pyramidon, and similar drugs may relieve, and in obstinate cases luminal in 1 to 1½ gr. every night at bedtime for three weeks, then gradually diminishing the drug to ½ gr. twice a week, may be of the utmost value.

Occipito-nuchal Neuralgia.

Occipito-nuchal neuralgia is sometimes functional in origin, but in others may be a form of infective rheumatism or fibrositis, or secondary to an influenza or nasal catarrh. A vaccine obtained from cultures of nasal discharges or from an infected tonsil or dental sepsis is successful at times, while radiant heat, ionisation, and massage will be sufficient in other cases, with occasional doses of aspirin or the stronger analgesics, but never morphia or heroin.

Psychalgia.

Functional head pains or psychalgias occasionally mimic trigeminal neuralgia somewhat closely, but may

always be distinguished if sufficient care is taken. Often the pain is boring or like a heavy weight on the vertex. Operations of all kinds and alcohol injection must be avoided entirely, as the pains are certain to be aggravated and rendered more difficult to cure. Psychotherapy may succeed in eradicating the trouble, and moral treatment in change of scene and occupation is preferable to the use of analgesic drugs.

WILFRED HARRIS, M.D. Camb., F.R.C.P. Lond.,
Physician to St. Mary's Hospital and to the Hospital for Epilepsy and Paralysis, Maida Vale.

Special Articles.

THE MEDICAL RESEARCH COUNCIL.
ANNUAL REPORT, 1921–1922.

THE report of the Medical Research Council for the year ending Sept. 30th, 1922, is much more than an account of the manner in which the sum placed at the disposal of the Council for that year has been expended. Since the grants have been distributed with the idea not only of initiating new work but of supplementing the funds already available from other sources where necessary, the report serves as a fair index of the development of medical research work throughout the country. For example, it is explained that if no large place in the schemes of research summarised is given to the investigation of cancer, this is because private endowment and subscription have done much to support investigation in this subject. From the purely financial standpoint the grant-in-aid at the disposal of the Council is only a small contribution from the State which meets and augments provision derived from other sources. The effective value of this public contribution gains from two circumstances. It gains from its mobility—for example, the Council was able to take immediate measures, on the discovery of insulin, to encourage and support at several centres research work designed to expedite its production on a large scale. It is greatly enlarged, too, by this partnership with private effort; without this it could only have supported effectively a far narrower range of research work than that which this report displays.

The General Framework.

The sum provided by Parliament for the expenditure of the Medical Research Council during the year was £130,000; out of this the cost of the work of the Industrial Fatigue Research Board and the grants formerly made for researches into mental disorders and for certain pathological investigations to the Boards of Control for England and Wales and Scotland had to be met. £8000 were provided for administration, £34,000 for the expenses of the National Institute for Medical Research, and £88,000 were allocated to research work in specific subjects by scientific men, to research in clinical medicine, and to the investigations of the Industrial Fatigue Research Board.

The seven sections into which the report is divided are the more readable because the classification of subject matter is not carried out on a rigidly logical plan; overlapping or cross references constantly occur. After an introductory section, the work in progress at the National Institute of Medical Research is outlined. Section III. deals with experimental medicine and the research work of the clinical units in various hospitals, in so far as this is subsidised by the Council. Section IV., on the determination of biological standards and the methods of biological assay and measurement, includes an account of that part of this work which is being undertaken at the National Institute of Medical Research, to which only brief reference had been made in Section II. In Section V. all attempt at topographical division is abandoned, and research in specific subjects is described under the headings of the disease investigated, irrespective of the place where such investigations are carried on. In Sections VI. and VII., researches in industrial medicine and fatigue, recent benefactions to medical research and education are noted, and the report is concluded by a tribute to the late Dr. W. H. R. Rivers. The appendix contains the names of the members of investigation committees for special subjects—elsewhere the gratuitous service on these committees on the part of scientific men receives cordial appreciation—and a complete index of personal names referred to in the report and of institutions where work is being carried on.

Certain general lines of development in the work undertaken are noteworthy. Quarterly conferences between the Council, the Development Commission, the Department of Scientific and Industrial Research, and a representative of the Royal Society, have been arranged, to maintain coöperation between these bodies. The assistance given by the Council, at the request of the Health Section of the League of Nations, to the International Conferences summoned to discuss the international standardisation of biologicals is likely to lead to important results. New weapons for investigating filterable viruses, in the shape of new technical methods, are expected to give a fillip to this work, and within and without the National Institute biochemists, physicists, and pathologists have been enlisted to work in association with investigators at fever hospitals. The difficulty of proceeding by sound experimental methods in dealing with diseases attributed to filterable viruses in human beings has led the Council to make arrangements for an experimental study of distemper in dogs. It seems probable that the infective agent is a filterable virus, and there is ground for hope that the study of dog's distemper under strict experimental conditions may throw important light upon analogous problems of human disease.

National Institute for Medical Research.

The need for field laboratories in close effective touch with the National Institute has recently become urgent. The work on filterable viruses will require facilities for isolation and study of diseased animals which are impossible within the limits of the Institute itself. The Council are thus to be congratulated on their purchase of a small site for field laboratories outside the metropolitan area, within easy reach of Hampstead, where this and other work will be carried out.

Research in the National Institute has been carried on vigorously, with close coöperation between the six departments. We have selected from the urgent activities recorded a few examples typical of the work in progress in each department.

Department of Biochemistry and Pharmacology,—Under the general direction of Dr. H. H. Dale, Dr. Lovatt Evans has done work of fundamental importance on the acid-alkali balance of the blood. Dr. Dale and Dr. C. H. Kellaway have completed and published work on anaphylaxis and anaphylatoxins, while Dr. J. H. Burn has cleared up a puzzling discrepancy between experimental findings and clinical observations on the relation of the sweating produced by pilocarpine to the integrity of the nerve-supply of the sweat glands. Dr. H. W. Dudley's unsuccessful efforts to isolate the active principles of the posterior lobe of the pituitary gland are highly instructive. For example, a crystalline picrate was isolated which, after several recrystallisations, showed an intense action upon uterine muscle. This proved, on ultimate purification, to be an inert substance to which a mere trace of the true active principle had been adherent. It seems clear that principles having an activity of this order will not be directly isolated and identified by methods at present available. Dr. H. King has completed an investigation proving that the previous conceptions of the nature of muscarine were erroneous, since the materials subjected to analysis consisted chiefly of choline contaminated with muscarine.

Department of Experimental Pathology, Bacteriology, and Protistology.—Captain S. R. Douglas, the director, has been engaged on special studies of the cultivation and isolation of the *B. diphtheriæ* for the Bacteriology Committee. For the Committee on the Biological Actions of Light preliminary experiments were made to ascertain if overdoses of light rays tend to allow the tissue of resistant animals to be invaded by bacteria. These experiments were made on rats, and it was found that when tubercle bacilli present in the skin received the application of light from a mercury vapour lamp on a shaved area a progressive lesion was produced in a considerable percentage of the animals, while, in control animals, ordinary regressive lesions commonly seen in the rat were present. Attempts have also been made by Captain Douglas to determine the thermal death-point of tubercle bacilli occurring in naturally infected milk. It appears to be certain that a temperature of 65° C. for 30 minutes will kill the tubercle bacilli in naturally infected cow's milk. Dr. W. E. Gye has, with Dr. W. Purdy, investigated the pharmacology of colloidal silica; and with Dr. E. H. Kettle, of St. Mary's Hospital, he has published studies of the effects of silica dust upon the tissues, with special regard to the problems of industrial tuberculosis, and has begun some special studies of the pathology of general tuberculosis in young people. Dr. P. P. Laidlaw has attempted to define more closely the factors which favour the growth of pathogenic bacteria. Some constituent of uncertain nature, present in meat extract, is strongly stimulating. In the department of protistology, Mr. C. Dobell, in collaboration with Dr. Gye, is studying the microscopic and cytological methods best suited for continuing work on spirochætes, as a preliminary to the resumption of work on the ætiology of disseminated sclerosis.

Department of Applied Physiology.—Dr. Leonard Hill, the director, and Dr. Argyll Campbell have continued investigations into problems of blood heat and metabolism. It was found that balneotherapy at the Hayling Island Colony increased by 100 to 200 per cent. the metabolism of the children who were immersed without muscular movement. It was concluded that open-air treatment, heliotherapy, and balneotherapy might be applied with advantage to cases of illness other than tuberculosis usually involving long confinement in bed. A wind tunnel has been constructed at the Institute, fitted at one end with a suitable fan so that a wide variation of cooling powers can be obtained within the tunnel. At the other end a walking platform, electrically revolved, has been inserted in the floor; on this, walking or running can be undertaken by the subject, almost stationary in relation to the walls and the observer, and cooling can be effected as desired. The amount of cooling necessary for comfort during various degrees of muscular work can thus be calculated.

Department of Applied Optics.—The studies of Mr. J. E. Barnard, the honorary director of this department, for the improvement of microscopical methods has been continued. With a view to reducing certain instrumental difficulties met with, a new type of illuminant, a new form of microscope, and certain improved optical parts have been evolved and have proved of much service. A simple and inexpensive appliance has been devised for the easy identification of the spirochæte of syphilis, by which the number of convolutions in the spirochæte can be quickly determined in reference to the diameter of a red blood cell. In view of the common want of agreement between the micrometric results obtained by different workers describing the same structures, an apparatus has been installed to which any worker in the Institute can refer, constancy and accuracy being thus assured. In collaboration with Captain Douglas, the structure of bacteria seen as the result of staining has been carefully compared with photographs taken of living organisms by means of ultra-violet light. The results are interesting and suggestive, as showing the changes that are due to the processes incidental to staining. Studies of the use of ultra-violet light in microscopy have been continued with encouraging results. Shorter wave lengths are being used and the results indicate that structures of a smaller order will be resoluble.

Department of Statistics.—Among the investigations in progress in this department is one undertaken on the incidence of cancer in different trades, from statistics placed at the disposal of the Council by the Registrar-General. The data refer to 46,235 deaths among males, both occupied and retired, occurring in over 900 trades and professions in England and Wales during the period 1910–12. This material is to be examined and reported on by Dr. J. Brownlee in collaboration with Prof. E. L. Collis, of the Welsh National Medical School.

Library and Publications Department.—The Council again draw attention to the fact that approved persons are allowed free use of the library, and that assistance is offered to those working on the Council's behalf in the verification of references and in the supply of information.

Standardisation of Biologicals.

Work directed to the determination of biological standards, and of methods of biological assay and measurement, for substances of which the physiological effects cannot be quantitatively estimated by direct chemical means, continues. Another branch of work is the standardisation of pathological methods with a view to uniformity of results: this includes both the maintenance of central sources for the supply of standard types of micro-organisms and of standard sera, and the devising of serological and other methods for general acceptance.

In standardising tests for arsenobenzol compounds it has been found that the curative powers of arsenobenzol substances, as tested on trypanosomiasis in mice, could be adopted as an index of their therapeutic value in human syphilis. A trustworthy standard of reference for pituitary extract has been elaborated by Dr. Dale and Dr. Burn, whereas in the hands of Dr. P. Hartley, the dried sample of antidiphtheritic serum, which is contemplated as the standard of antitoxin for this country, should be ready for issue in the early future.

The national collection of type cultures at the Lister Institute, under the direction of Prof. J. Ledingham, has made steady progress. Over 300 fresh types were received, and over 2500 cultures were distributed. It is of interest to learn that the cultivation of *B. tularense* has proved so dangerous to laboratory workers in this country and in America that it has been deemed inadvisable to continue its propagation in the National Collection. The work of the Standards Laboratory at Oxford has been maintained by Dr. A. D. Gardner, under the general direction of Prof. G. Dreyer. A comparative trial of the Sigma and Wassermann reactions in 1000 specimens of blood from syphilitic patients and controls has been made, and a further series of tests, including the Sachs-Georgi and Meinicke III. is in progress.

Research Subsidised by the Council in Various Centres.

In the Council's department of Clinical Research and the cardiographic department of University College Hospital Medical School, under the direction of Sir Thomas Lewis, experimental investigations have made possible a very complete conception of the action of quinidine in fibrillation of the auricles, and have explained the instances not only of successful but also of unsuccessful treatment. The subdivision of patients into groups before treatment with quinidine, according to whether success may be expected or not, is being attempted, and the after-history of successfully treated cases is being followed up. The comparative merits of quinidine and digitalis in the treatment of clinical cases is also being investigated at the London Hospital by Dr. A. M. W. Ellis and Dr. A. E. Clark-Kennedy. At St. Bartholomew's Hospital Dr. G. K. Stone, in association with Mr. D. P. Dunhill, is endeavouring to ascertain whether in Graves's disease the thyroid yields a secretion differing

qualitatively from the normal: at the University of Sheffield the dietetic factors causing abnormal developments of the thyroid gland are being studied by Prof. E. Mellanby, while at the Royal Free Hospital Dr. G. S. Williamson is working at its pathology. At St. Mary's Hospital Sir Almroth Wright has been actively continuing his studies of immunisation with the assistance of Dr. L. Colebrook, temporarily seconded from the National Institute. The chief research supported at St. Thomas's Hospital by the Council during the year was that on renal disorders and function tests, carried out by a group of workers mainly under the direction of Prof. H. Maclean, Prof. J. Shaw, Dunn, at the University of Birmingham, and Dr. A. S. Strachan, at the University of Glasgow, are conducting work on experimental nephritis. At the Royal Infirmary, Edinburgh, by Dr. H. W. Davies and Mr. C. R. Harrington, under Prof. J. C. Meakins, disorders of the respiratory system have been the subject of special study, while the mechanism of respiration has occupied the attention of Sir J. Charlton Briscoe at King's College Hospital. A long series of clinical observations are being made at Guy's Hospital, with a large oxygen chamber, on the effects of oxygen administration. The data already collected indicate that patients suffering primarily from damage to the lung receive benefit from treatment with oxygen, but not those with circulatory disorders. Research work in clinical medicine is being carried on in various centres, notably at Norwich, Hull, Glasgow, Newcastle, and London, by Dr. H. J. Starling, Dr. E. E. Laslett, Dr. Ivy Mackenzie, Dr. D. K. Adams, Dr. W. E. Hume, Dr. L. S. T. Burrell, Dr. G. Bourne, and Dr. P. Hamill.

The financial support given to the St. Andrews Institute of Clinical Research has been increased. As part of an organised scheme for research on the problems of child-life, the factors contributing to dead births and premature births are being investigated by competent observers, including clinicians, pathologists, and physiologists in many centres throughout the country. Other problems connected with pre-natal influence being actively attacked are the toxæmias of pregnancy, metabolism, and general physiology in pregnancy and the lying-in period, and the influence of maternal nutrition on the infant. Post-natal studies include metabolism in infants and the influence of various factors on nutrition and growth. In this respect the attempt to obtain information at welfare centres, in spite of the cordial efforts to help made by the various officials, is said to have been disappointing. This is partly because the workers have not been trained to keep accurate records, and partly because the centres are congested. From an analysis of the comparatively small number of figures now available no correlation is manifest between the nutrition of the child under one year and the size of the family, position of the child in the family, or number of persons per room. On the other hand, there appears to be an indication of a direct correlation between the condition of the child and the health of the mother during pregnancy.

Work on rickets has been subsidised in Glasgow, Leeds, and various other centres. In Sheffield the experimental work in the recently established field laboratories is brought into close relation with clinical work in the Royal Infirmary. Closely associated with these endeavours to clear up the ætiology of rickets are the observations on the nature of the substance or substances giving its valuable therapeutic qualities to cod-liver oil, in connexion with which expeditions to Norway and Newfoundland were undertaken by Prof. J. C. Drummond and Dr. S. S. Zilva. Studies in deficiency diseases in Central Europe by Dr. Harriette Chick and her fellow-workers confirm many important researches made in England and America, and may serve to reconcile the hitherto apparently opposed points of view upheld respectively by the adherents of the hygienic and dietetic theories of rickets. Research in neurology aad psycho-pathology includes work on disseminated sclerosis, neuro-syphilis, and lethargic encephalitis, while Miss L. G. Fildes, at the University of Cambridge, is endeavouring to discover what specific psychological characteristics, if any, exist which mark off a mentally defective from a mentally normal individual. Valuable research work at the Lancashire County Asylum, the Maudsley Hospital, the Cardiff City Mental Hospital, and at the Scottish Western Asylum's Research Institute, Glasgow, and the Scottish Asylum's Pathological Laboratory, Larbert, is also in progress.

An Appreciation.

The foregoing examples must serve as an indication of the wide range in geographical situation, in personnel, and in the pathological conditions selected for investigation of the work being subsidised by the Medical Research Council. No less important than those mentioned are many other investigations being conducted in other branches of biochemistry, physiology, and pathology. For details of current work on tuberculosis, influenza, rheumatic fever, diphtheria, venereal diseases, arthritis, malignant disease, radiotherapy, epidemiology, and many other subjects we must refer readers to the report and to the published work referred to therein. In this connexion we would congratulate those responsible for its preparation on the reticence which they have observed as to the details of work still unpublished, except when it is actually in the press, while indicating the broad lines to which it is directed. Preliminary communications are recognised as unfair to authors and to the public, especially in a document designed for all sections of the community; but a report dealing solely with work already published, from which some of the glamour must already have departed, would make dull reading. The discrimination which combines brief summaries of the work completed in the period under review, with inspired comment on present activities, makes these annual reports issued by the Medical Research Council documents which are keenly anticipated from year to year as a living history of the developments, occasional disappointments, and brilliant successes of modern medical research.

DANGEROUS DRUGS ACT, 1920.

POSITION OF DOCTORS AND DENTISTS UNDER THE ACT.

By the Dangerous Drugs Act and the regulations made under it certain obligations in regard to the giving of prescriptions and keeping of records devolve on medical and dental practitioners, and the Home Secretary, with whose department rests the general responsibility for the administration of the Act and regulations, has had under consideration the best means of carrying out such inspection as may be necessary from time to time to ensure the due fulfilment of those obligations. He has come to the conclusion that such inspection would be best carried out by medical officers, and after consultation with the Minister of Health and the Scottish Board of Health it has been arranged that as a general rule this work shall be carried out in England and Wales by medical officers of the Ministry of Health, and in Scotland by medical officers of the Scottish Board of Health.

It is considered that it may be convenient for doctors and dentists to have a short statement of the main provisions of the Act and regulations in which they are specially concerned.

1. *General Provisions.*

(*a*) *Substances Involved.*—The substances to which the Dangerous Drugs Act applies are:—Raw opium and medicinal opium; cocaine and ecgonine and their salts; morphine and its salts; diamorphine (heroin) and its salts, and any preparation, admixture, extract or other substance containing one-fifth per cent. or more of morphine or one-tenth per cent. or more of cocaine, ecgonine, or diamorphine. (The above are collectively referred to as dangerous drugs.) The percentage in the case of morphine is calculated as in respect of anhydrous morphine.

No person is allowed to bring into, or take out of the country any of the drugs unless he is licensed by the Home Secretary, and no person is allowed to be in possession of the drugs (subject to the exceptions named in the next paragraph) unless he is licensed or otherwise authorised for the purpose, or unless the drug has been supplied for his use by a medical practitioner or in accordance with a medical or dental prescription.

(*b*) *Preparations Excepted.*—It should be noted that the following preparations, though they come within the Act, are specially exempted from the regulations, and may be bought and sold in this country in the same way as ordinary "poisons" under the Poisons and Pharmacy Act:—

Cereoli iodoformi et morphinæ, B.P.C.; emp. opii, B.P. 1898; lin. opii, B.P.; lin. opii ammon., B.P.C.; pasta arsenicalis, B.P.C.; pil. hydrarg. c. opio, B.P.C.; pil. ipec. c. scilla, B.P.; pil. plumbi c. opio, B.P.; pil. digit. et opii co., B.P.C.; pil. hydrarg. c. creta et opii, B.P.C.; pulv. cretæ aromat. c. opio, B.P.; pulv. ipecac co., B.P. (Dover's Powder); pulv. kino co., B.P.; suppos. plumbi co., B.P.; tablettæ plumbi c. opio, B.P.C.; ung. gallæ c. opio, B.P.; ung. gallæ co., B.P.C.

It should also be noted that the following preparations do not come within the Dangerous Drugs Act:—

Any preparation containing less than one-fifth per cent. of morphine or one-tenth per cent. of cocaine, ecgonine, or heroin. Thus any mixture containing in each drachm not more than 11 minims of tr. opii or 13 minims of liquor morphinæ hydrochlor., and 15 minims of liquor morphinæ acetat. would be unaffected by any of the provisions of the regulations.

(*c*) *Medical Practitioners and Dentists are Authorised Persons.*—Any duly qualified medical practitioner and any registered dentist is authorised by the regulations to be in possession of, and to supply, dangerous drugs, and (in the case of medical practitioners only) raw opium, *so far as it is necessary for the practice of his profession.* The words in italics are important: a doctor or dentist may not have or use the drugs for any other purpose than that of ministering to the strictly medical, or dental, needs of his patients.

Subsequently throughout this Memorandum "doctor" is to be read as meaning a medical practitioner whose name is on the Medical Register; and "dentist" as a dental practitioner whose name is on the Dental Register.

In what follows it should be noted that Part 2 applies to all practising doctors and dentists; Part 3 to those only that dispense.

2. *Regulations Applicable to All Doctors.*

(*a*) *Prescriptions.*—The following remarks only apply to prescriptions for medicines containing a dangerous drug in sufficient strength to come within the Act (see above).

The Home Secretary has power to prescribe an official form to be used for such prescriptions, but he has not at present done so.

Under the regulations the prescription—

(1) Must be in writing and be dated.
(2) Must be signed with the *full name* of the prescribing doctor or dentist (the Christian names as well as the surname must be written in full; initials do not satisfy the regulations.[1])
(3) Must bear the *address* of the prescribing doctor or dentist (except in the case of prescriptions issued for National Health Insurance purposes on the official form).
(4) Must state the name and address of the patient (a prescription may not be given for the use of the prescriber himself).
(5) Must state the total amount of the drug to be supplied on the prescription.

Dentists may give prescriptions for dental treatment only, and in addition to complying with the above requirements they must mark the prescription "for local dental treatment only."

The prescription has to be retained by the chemist by whom it is dispensed (except in the case of prescriptions issued for National Health Insurance purposes on the official form), and he is only allowed to dispense it once, unless the doctor or dentist specially directs in the prescription that it may be dispensed twice or three times (but not more than three times), at intervals which he specifies. In no case is the chemist allowed to dispense it more than three times.

A doctor or dentist who gives, and a chemist who accepts and dispenses, a prescription not drawn up in every particular in accordance with these regulations, commits an offence against the Act.

The Home Secretary desires to impress as strongly as possible on doctors and dentists the importance of their observing these requirements strictly when giving a prescription. Any irregularity on the part of the doctor or dentist may lead to delay in the patient obtaining the medicine prescribed for him—and it is extremely unfair to the chemist that he should be placed in the position of delaying an important prescription, and possibly offending the doctor or dentist, or committing a breach of the law. The Secretary of State has reason to believe that at the present time there are very numerous irregularities in giving prescriptions for the drugs, and representations have been made to him by chemists as to the difficult position in which they are placed, and, he is afraid he must add, the annoyance or resentment displayed by doctors and dentists in many cases at being asked to correct the irregularities of their prescriptions.

(*b*) *Method of Obtaining Supplies of the Drugs.*—A doctor or dentist who requires the drugs for the purpose of his practice may obtain them from any person who has a general licence or authority under the Dangerous Drugs Act to supply the drugs. All pharmacists who are lawfully keeping open shop in accordance with the provisions of the Pharmacy Acts are so authorised (except in the rare cases where the authorisation has had to be withdrawn for offences against the regulations), and all, or practically all, the established firms of wholesale chemists have also obtained licences from the Home Secretary to supply the drugs. In any case of doubt, a doctor or dentist can always ascertain, by inquiry from the Home Office, whether a firm is authorised to supply the drugs or not.

It will assist the administration of the law, and probably also save the doctor or dentist some inconvenience, if he gives all orders for the drugs in writing (except in cases of extreme emergency), and signs them with his full name and address. The chemist has to satisfy himself before selling the drugs that the purchaser is authorised by the regulations to have them, and in cases where the doctor or dentist is not well known to him some delay in making inquiries may be avoided by a full written order, duly signed.

If a messenger is sent by the doctor or dentist to take delivery of the drugs, the messenger must be given an authority in writing, signed by the doctor or dentist, to receive the drugs on behalf of the doctor or dentist: a chemist is forbidden to deliver drugs to a messenger not so authorised.

A doctor or dentist is not allowed to be supplied with the drugs on a prescription made out by himself in his own favour.

Doctors and dentists are advised to keep any dangerous drugs, when not in use, under lock and key, so far as possible. This is not actually required by the regulations, but is obviously a desirable precaution.

A doctor or dentist who requires the drugs solely for administration to his patients by himself personally, or under his own direct personal supervision, and does not dispense them, is under no obligation to keep the records required by the regulations as explained in Part 3 of this Memorandum.

3. *Regulations Applicable to Dispensing Doctors.*

Doctors who dispense or supply medicine[2] are under the obligation to keep the registers of purchases and supplies described below.

(*a*) *Register of Purchases.*—Separate registers or separate parts of a register are to be appropriated for each of the drugs. The tabular form in which the register has to be kept has the following headings:—

(1) Date on which supply received.
(2) Name of person, body, or firm from whom obtained.
(3) Address of person, body, or firm from whom obtained.
(4) Amount obtained.
(5) Form in which obtained.

The correct entry in the register must be made on the day on which the drug is received or the following day: and entry must not be cancelled, obliterated or altered—any mistake must be corrected by a footnote or marginal note, giving the correct particulars, and dated.

(*b*) *Register of Supplies.*—Similar registers or parts of a register must be kept for each drug "supplied" in the tabular form, with headings as follows:—

(1) Date of supply.
(2) Name of person to whom supplied.
(3) Address of person to whom supplied.
(4) Authority of person, body, or firm to be in possession of the drug.*
(5) Amount supplied.
(6) Form in which supplied.
(7) Specify the ingredients of the prescription.

* Where, as will usually be the case, the supply is on the doctor's own prescription, it will be sufficient to enter the word "Patient" in this column.

The entry must be made on the day on which the drug is supplied, or the following day. The same rules as to mistakes and corrections apply.

N.B.—It is specially provided, however, by the regulations, that if a doctor keeps a day-book in which he records particulars of any of the drugs dispensed by him to his

[1] It is proposed in the case of prescriptions issued for National Health Insurance purposes on the official form to require only the surname in full, with the initials of the Christian names.

[2] The obligation would apply in the case of a doctor or dentist leaving a supply of any of the drugs with a nurse for administration to a patient during the absence of the doctor or dentist.

patients, with the name and address of the patient and date of supply, he need only record in his register of supplies the date and the appropriate reference to the entry in his day-book.

A doctor who dispenses at more than one set of premises is required to keep a separate register or registers at each set of premises.

All records, including registers, day-books, and other documents, must be kept for not less than two years from the date of the document or the last entry therein.

4. Offences and Penalties.

A doctor or dentist who obtains, or attempts to obtain, the drugs for a purpose not covered by his authorisation, or who infringes any of the regulations, commits an offence against the Act, and, if convicted, is liable to a fine of £200, or to imprisonment, with or without hard labour, for six months, or to both fine and imprisonment.

Further, the Home Secretary has power, after the conviction of any doctor or dentist, to withdraw from him his authorisation; the effect of this would be to deprive him entirely of the right to be in possession of or to supply the drugs.

5. Hospitals, &c.

Hospitals, asylums, Poor-law institutions, or sanatoriums supported by a public authority or out of public funds or by a charity or voluntary subscriptions, have been exempted by Home Office Order from the operation of the Dangerous Drugs Regulations, subject to compliance with the conditions laid down in the Order. The terms of the Order (dated August 15th, 1921, and to be obtained from the Stationery Office) should be consulted.

6. Inspection.

All registers and other records required to be kept for the purposes of the Dangerous Drugs Act and Regulations thereunder, and any stocks of the drugs held, must at all times be available for inspection by any duly authorised inspector. As indicated in the opening paragraph of this memorandum, the Home Secretary has authorised medical officers of the Ministry of Health and of the Scottish Board of Health to act as inspectors for this purpose in England and Wales and in Scotland respectively.

Notice of a visit for the purposes of inspection will not necessarily be given, and medical practitioners who dispense should make such arrangements that the registers and other records can be produced, if required, for inspection in their absence.

This memorandum will be printed in pamphlet form, and will be put on sale by the Stationery Office.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Medical Fees.

IN Germany the Medical Practice Act rules that fees are subject to arrangement between the medical man and his patient. Only in cases where nothing has been agreed upon is the Government legally authorised to fix the charges. In the majority of the Federal States an official regulation does indeed exist. The oldest regulation in this connexion was made in 1815, and although its items had long lost their meaning it was actually in force until altered in 1895. Other alterations were made in 1920 and in 1922, the latter providing for Government alteration of fees according to the value of the currency, at first every three months, and lately even every month. Additional payment was sanctioned, first of 50 per cent., then of 200 per cent., and in December, 1922, actually of 900 per cent. of the original official fee. The regulations provide for maximum and minimum fees graded according to the gravity of the case and the financial position of the patient; the minimum fee is to be paid only when the bill is met out of public or charity funds or by sick clubs. In certain country districts medical fees are graded in accordance with the price of bread; in Nassau, for instance, the price of a consultation was before the war 1 mark—the equivalent of two 4-lb. loaves of bread. Owing to the general poverty the fee is now reduced by half. One loaf now costs 500 marks; this sum is, therefore, at present charged for a consultation, and 1000 marks are charged for a visit. In Berlin the Medical Chamber (see below) has advised members of the profession to charge 500 times the pre-war fees, which for a consultation ranged between 2 and 10 marks; the minimum fee for a consultation is now 1000 marks, and for a visit upwards from 1500 marks. A tariff is posted in the doctor's waiting-room, so that patients know exactly what they have to pay. These fees are valid only for Germans and for foreigners who live in Germany and receive their wages in German currency. Foreign tourists and business men have to pay the fees current in their countries, the Medical Chamber having made an inquiry as to the fees customary in most of the principal countries. The last number of the *Berliner Aerztekorrespondenz*, the official organ of the medical chamber, contains the fees for England, Holland, Italy, Denmark, Jugo-Slavia, Norway, and Czecho-Slovakia. The lists contain the fees for general practitioners, for specialists, and for hospital physicians and surgeons, according to the financial standing of the patient. The English fee for a consultation is set at from 2*s.* 6*d.* to 5*s.*, and so on. The present value (Jan. 5th) of the pound sterling in Germany is 32,000 marks.

Medical Study and Examinations.

A commission, composed of representatives of the Federal Governments, the universities, and the medical profession, is to meet in Berlin, under the chairmanship of the Minister of the Interior, to consider reforms in medical study and examinations. The medical course has hitherto occupied five years; at the end of the second year a first examination takes place, the subjects being natural science, physics, chemistry, anatomy, and physiology. No medical student who does not pass that examination is admitted to the second or clinical part of the course. After a further three years the final examination is taken in clinical medicine, surgery, obstetrics, hygiene, and some special branches of medicine. The student has then to pass through the so-called "practical year" as a sub-assistant in a recognised hospital, after which he becomes qualified, and may settle anywhere in Germany. The principal drawback of the present system of medical study is that it is much too theoretical. Clinical training, for instance, is usually carried out as follows: During a clinical lecture a student is called upon to examine a patient under the professor's supervision, and in the large universities this may happen only a few times each term. In the smaller universities, where there are fewer students, only a restricted number of beds is at the disposal of the students. It must be remembered that only the university clinics are used for the training of medical students; the great hospitals, with numerous patients and well-equipped laboratories, have no connexion with the universities. Before the war a tentative arrangement was made by which large hospitals should place their wards at the disposal of medical students, and this system was first started in Düsseldorf; there a so-called medical academy was founded, originally intended for post-graduate study, but later affording facilities for students to obtain one or two terms of clinical training. But a medical student has generally had little opportunity to examine large numbers of patients himself or to follow up a case—except when he acts as a "famulus"—a voluntary clinical clerk or dresser. In fact, the majority of students receive no practical training before the "practical year" which follows the passing of the final examination. Thus, the clinical training is quite inadequate; moreover, the practical year is itself not always satisfactory, as candidates often go to small hospitals in little towns where they are either insufficiently supervised or are employed as assistants in order to save expense, to the detriment of the patients and of the qualified medical man who has a better claim to such an appointment. The practical year comes too late to secure to the student an adequate clinical training, and it is therefore proposed that one term in the midst of the course should be spent exclusively in hospital work without lectures. The office of famulus would then become compulsory; the medical course

would last six years, the practical year after examination would be abolished, and the qualification given immediately after examination at the end of the sixth year. The present examination is spread over two to three months, but Prof. His, who before being called to Berlin was professor at the University of Basle, suggests that a time of two to three weeks would be sufficient, as proved by experience in Switzerland.

Organisation of the Medical Profession in Germany.

The Medical Chamber (Aerztekammer) mentioned above is a body officially representing the medical profession of a province, as the Chamber of Commerce represents the merchants, and the Lawyers' Chamber (Anwaltskammer) the advocates. Each province has its medical chamber, so that there are in Prussia 11 of these chambers, Berlin and the province of Brandenburg having one chamber between them. The chambers are elected every three years by the votes of the medical men of the individual province. They meet two or three times a year; current business is dealt with by a permanent committee elected by the chamber. A joint body composed of representatives of individual chambers meets to discuss matters affecting the general interests of the profession. Before proposing laws affecting medical interests the Government usually consults the opinion of the chambers or of the joint committee. A representative of a provincial administration, or of the central Government, may attend the meetings and give information on behalf of, and answer questions put to, the Government. The medical chambers are entitled to raise, from every registered medical man, taxes which are just as compulsory as the national income tax. The annual budget of a medical chamber must be discussed and passed by the chamber at their first meeting in the year. Apart from the expenses of the chamber, the money is spent for the support of widows and children of deceased members of the profession, and for other purposes connected with professional interests—e.g., post-graduate study. The medical chambers may also pass certain by-laws for the medical profession. The Berlin Medical Chamber has established in its district a so-called Contract Commission (Vertragscommission), and has enacted that every contract between a medical man and a sick club or insurance company must be agreed to by the commission before coming into force.

Medical Courts of Honour.

Every medical chamber appoints a Court of Honour of five members, who have authority to punish offences against the generally-adopted medical rules and etiquette, such as public advertisement, connexion with a quack, and the like. A Court of Honour has the right to summon a medical man and, after legal proceedings, to punish him with a reprimand and a fine; the court has, however, no power, like that of the General Medical Council in Great Britain, to erase names from the Medical Register. No German authority can so erase a name, except in cases where medical diplomas have been obtained by fraud. In the proceedings of the Courts of Honour a representative of the Government acts as public prosecutor, whilst the defendant is entitled to legal assistance or to that of another medical man. Courts of Honour may also arbitrate in disputes arising between medical men. In a committee of the Prussian Diet, Dr. Weyl, a medical member of the House belonging to the Socialist Party, recently moved that Medical Courts of Honour should be altogether abolished. In the discussion which followed some members spoke against abolition, and the motion was rejected with 11 against 8 votes. A motion requiring a reform of the procedure, with provision of facilities for appeal against decisions of the courts, was then passed, together with a recommendation that the Government be requested to arrange for an inquiry among the medical profession as to the advisability of the further existence of these courts.

The Services.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. H. Simson retires on ret. pay and is granted the rank of Col.

Maj. J. W. S. Seccombe, from the half-pay list, is restd. to the estabt.

Capt. S. D. Large retires, receiving a gratuity, and is granted the rank of Lt.-Col.

Capt. A. G. Stevenson retires, receiving a gratuity.

Capt. H. S. Milne relinquishes the temp. rank of Maj. on ceasing to be spec. empld.

The undermentioned Capts. relinquish their commns.: J. C. Brash (granted the rank of Maj.), W. J. Dowling, on account of ill-health (retains the rank of Capt.).

ARMY RESERVE OF OFFICERS.

Army Dental Corps.

Capt. W. H. Donald, late Spec. List, to be Capt.

TERRITORIAL ARMY.

Capt. H. M. Holt (late R.A.M.C., Spec. Res.) to be Capt.

Capt. W. F. Denning (late 4th Bn., Duke of Wellington's Regt.) to be Capt.

The undermentioned relinquish their commns. and retain their rank except where otherwise stated: Lt.-Col. A. R. Tweedie (granted the rank of Col.); Majs. F. B. Treves (granted the rank of Lt.-Col.), P. Moxey (granted the rank of Lt.-Col.), and C. E. Silvester; Capts. P. S. Martin (granted the rank of Maj.), F. L. Newton, D. W. G. Griffith, J. McG. H. Reid, J. R. Herbertson, H. J. B. Fry, C. H. Crawshaw (granted the rank of Maj.), W. O'Brien, and J. M. Mitchell.

Lt.-Col. A. B. Lyon having attained the age limit is retired, and retains the rank of Lt.-Col.

Maj. W. Duncan resigns his commn. and is granted the rank of Lt.-Col.

General Hospitals: The undermentioned having attained the age limit are retired, and retain their rank except where otherwise stated: Lt.-Cols. Sir W. H. White (Bt. Col.), C. W. M. Moullin (Bt. Col.), R. J. W. Oswald, W. H. Battle, Sir D'Arcy Power, F. Warner, and J. Calvert; Majs. W. McA. Eccles (Bt. Lt.-Col), T. D. Acland (Bt. Lt.-Col.) (granted the rank of Lt.-Col.), C. H. Fagge (Bt. Lt.-Col.) (granted the rank of Lt.-Col.), Sir F. W. Andrewes, H. M. Fletcher, L. B. Rawling, Sir P. Horton-Smith-Hartley, F. J. Steward (granted the rank of Lt.-Col.), J. Hutchinson, G. N. Pitt, and W. W. Griffin; Capts. Sir H. M. Rigby (Bt. Lt.-Col.) (granted the rank of Col.), E. H. Fenwick (Bt. Maj.) (granted the rank of Lt.-Col.), H. H. Taylor (Bt. Maj.), Sir W. A. Lane (granted the rank of Col.), J. C. W. Graham (granted the rank of Maj.), R. Whittington (granted the rank of Maj.), W. R. Wood (granted the rank of Maj.), J. H. Thursfield (granted the rank of Maj.), J. Shardlow, M. N. J. Rigby, L. A. Parry, H. Williamson, Sir T. J. Horder, F. A. Rose, C. E. West, W. D. Harmer, J. J. Perkins, W. J. Hadley, H. N. Fletcher, F. A. S. Hutchinson, A. M. Daldy, H. Gervis, G. Morgan, A. M. Colcutt, A. J. Hutchison, C. N. Chadborn, A. G. Bate, C. H. Bryant, W. L. Brown, H. E. G. Boyle, and C. M. H. Howell.

Capts. E. C. Hughes and J. F. Trewby relinquish their commns. and retain their rank.

Capts. H. D. Clementi-Smith and H. W. Wilson relinquish their commns. and are granted the rank of Maj.

Sanitary Companies: Capt. F. T. H. Wood relinquishes his commn.

Capt. W. H. Davison relinquishes his commn. and is granted the rank of Maj.

Supernumerary for Service with the O.T.C.: H. H. Woollard (late Australian Army Medical Corps) to be Capt. for service with the Univ. of Lond. O.T.C.

TERRITORIAL ARMY RESERVE.

Cols. Sir C. J. Symonds and H. H. Tooth having attained the age limit are retired, and retain the rank of Col.

Capt. J. H. Paul relinquishes his commn. and retains the rank of Capt.

Capt. E. D. Ellis, from General List, to be Capt.

General Hospitals: Capt. D. Mallam, from 1st E. Genl. Hosptl., to be Capt. Capt. B. H. Nicholson having attained the age limit is retired, and retains the rank of Capt.

TERRITORIAL DECORATION.

The King has conferred the Territorial Decoration upon the undermentioned officers: Majs. H. A. Ahrens, R. Y. Anderson, E. H. Brunt, W. F. Munro, and H. B. Low.

INDIAN MEDICAL SERVICE.

Lt.-Col. H. J. K. Bamfield to be Col.

The King has approved the relinquishment of the temporary rank of Capt. Nagendra Narain Majumdar and the retirement of Maj. A. C. Ingram.

Correspondence.

"Audi alteram partem."

REST AND EXERCISE IN PULMONARY TUBERCULOSIS.

To the Editor of THE LANCET.

SIR,—Dr. Claude Lillingston's remarks in your issue of Jan. 13th, daring in these days and in this country, on the subject of rest and exercise in pulmonary tuberculosis, deserve the public support of such as are in agreement with them. I am myself one of these, and have already expressed similar views on the importance of prolonged rest in active disease, and the "cure-in-three months" fallacy, in an article now awaiting publication in THE LANCET. The question of "graduated exercise" or "graduated labour" I omitted from that publication save by implication, and it is this omission which tempts me to supply the present letter in support of Dr. Lillingston's condemnation of graduated labour as an end in itself, and applied, as commonly happens, to cases still in various degrees active. "Tolerance" to autotuberculin, the achievement of graduated exercise, has admittedly its own proper uses, and in certain cases of slight disease may probably be induced early without harm, and certainly with great convenience. But, these apart, it seems to me that graduated exercise as usually applied (that is to cases recently febrile) is based on a triad of fallacies.

1. The idea that "tolerance" is, or carries with it, a "high tide of immunity" (Paterson) other than that "high tide" which belongs to every "immune response," and which is presumably just as efficacious in a bed-patient without "tolerance," as after a day's work on grade VI. of "graduated labour." Where, I would ask, is the evidence to support this idea?

2. The impression that because "tolerance" saves from harmful "reactions," therefore active disease is unaffected by exercising the lung. This fallacy I have tried to dispose of in my article already referred to on the importance of rest.

3. The impression, present in many minds, that "tolerance" implies arrest of disease, which is very far from the truth.

The physical exertions which these ideas encourage are, in my opinion, responsible in many cases for needless spread of disease. The decision as to activity and seriousness of disease should not be allowed to rest on a temperature chart or other evidences of autoinoculation alone—the physical condition of the lung must also be taken into account! I remember myself passing through a phase of inexperience when I was doubtful whether "tolerance" might imply absence of activity, but experience soon resolved this doubt, and I now know with many others that "tolerance" and "activity" are not incompatible.

I am, Sir, yours faithfully,

CLIVE RIVIERE.

Queen Anne-street, W., Jan. 15th, 1923.

TREATMENT OF EARLY PULMONARY TUBERCULOSIS IN THE YOUNG ADULT.

To the Editor of THE LANCET.

SIR,—It was with great satisfaction that I read Dr. C. Lillingston's article in THE LANCET last week. The expression of these views in an authoritative journal is some consolation to one who has been preaching almost identical opinions for the last 14 years. There is one observation I should like to add, and that is the necessity of diagnosing early pulmonary tuberculosis from a consideration of symptoms.

With regard to treatment by colloid of calcium I may say that when an article by me was published in January, 1922, in the *British Medical Journal* the benefit of this treatment had practically ceased to be conjectural, and might have been said to have been established so far as this sanatorium was concerned, but, of course, it will not cure all cases. Since then colloid of calcium has proved to be a most valuable therapeutic agent in many hands. It does not operate by suggestion, except in so far as any remedy which does good will add to the feeling of hopefulness, but is a material agent acting similarly to such a drug as iodide of potassium in specific disease. Anyone who read Dr. T. C. Graves's article in THE LANCET of Nov. 4th, 1922, must have been struck by the benefit produced by this agent on individuals who might be said to have no minds. If this chemical substance be given carefully and perseveringly its usefulness cannot fail to be appreciated both in tuberculosis and many other conditions of sepsis.

I am, Sir, yours faithfully,

New Cumnock, Jan. 13th, 1923. EDWARD E. PREST.

EMETINE BISMUTHOUS IODIDE IN THE TREATMENT OF AMŒBIASIS.

To the Editor of THE LANCET.

SIR,—Major Manson Rennie's paper on the value of emetine bismuthous iodide (E.B.I.) in the treatment of amœbiasis published in THE LANCET of Dec. 30th, 1922, is very timely, and it is particularly welcome coming as it does with authority from the Hospital for Tropical Diseases. I have been greatly perplexed during the last three years by the increasing number of people who tell me that emetine in whatever form it is given is "no good" in the treatment of amœbic dysentery. I have heard this opinion stated by a variety of people including physicians on the staff of teaching hospitals and men back from military service in the East. Looking at it from the patient's point of view I have been not merely perplexed but worried, as the only alternative treatment that has been suggested to me—e.g., opium, rectal wash-outs, and vaccines of some coliform organism—seems to be about as useful as aspirin might be for a patient with an intracranial gumma. My own experience of the treatment of amœbiasis is naturally small, but such as it is it tends to confirm Major Rennie's conclusions; and I cannot help feeling that a good deal of the disrepute into which E.B.I. has fallen is due to the fact that we focus our attention on the relapsing case that does resist all forms of treatment and forget the ninety-and-nine that go their way rejoicing.

Towards the end of the war the hospital to which I was attached as pathologist became a centre for dealing with officers returning to the London area with dysentery; and amongst the considerable number of cases of bacillary, amœbic, and clinical dysentery that thus came under the care of Sir William Hale-White, who was in charge of the dysentery huts, there were 33 cases in whom infection by *E. histolytica* had been discovered and who were stated to be either still infected after emetine treatment or else only recently treated and with subsequent tests for "cure" still uncompleted. The test for "cure" was that officially laid down—viz., six negative examinations of the stools during the three weeks following the treatment with at least three tests in the third week. Of the 33 cases, 12 appeared on close investigation to have had efficient emetine treatment (probably E.B.I.) and gave the necessary number of negative tests; all the others showed either amœbæ or cysts in the stools or else gave a very doubtful history of previous treatment, and in view of our previous experience of the disease in the ordinary routine of the hospital all these cases were at once given a course of E.B.I. followed by a second course when necessary; 13 of these cases then gave the necessary six negative tests. This left us with 8 cases which we regarded as resistant to E.B.I. and 75 per cent. of "cures." Since then in the ordinary routine of a civil hospital I have come across six cases

of amœbic dysentery either undiagnosed after months of suffering or else correctly diagnosed but having had no definite course of emetine treatment; four of these were relieved of their symptoms and their stools freed from cysts and amœbæ by E.B.I., one is still under observation, the stools being as yet free but the final tests incomplete, one left the hospital greatly improved but with the tests incomplete; the last case has probably relapsed as the drug was given intermittently owing to uncontrolled vomiting. In saying so much in favour of E.B.I. I have no wish to claim that in those cases where the stools are apparently freed from cysts and amœbæ for a mere three weeks there is any proof that the infection is really at an end. For all I know it may be that no one who has once been infected by *E. histolytica* has ever lost the infection; and I do know that of the cases quoted above at least two still have mild recurrent attacks of diarrhœa when cysts are to be found in the stools. But even if emetine does not produce a complete sterilisation so far as *E. histolytica* is concerned, so long as it can in many cases change a life of miserable discomfort into one of almost normal health it surely deserves our blessing.

Whilst on this subject I would like once more to urge the trial of the oil of chenopodium in those cases which resist all forms of emetine treatment and in which symptoms persist. Of the 33 cases under Sir William Hale-White quoted above 8 failed to respond to E.B.I.; 7 of these were treated with the oil of chenopodium; 3 were relieved of their symptoms and gave six negative stool examinations; 2 were completely unaffected by the drug, and 2 were transferred with only three negative tests when the hospital was closed. These results, however meagre, suggest that the drug is at least worth trying. I am aware that in some quarters it is considered too dangerous a drug to use, and on one occasion when advocating its trial in a discussion I was told by high authority that it was too dangerous a drug to play about with. I ask no one to play with this or any drug, but inasmuch as it is now in routine use in America as the recognised treatment in hookworm disease and has been given to thousands of people, children included, the difficulties of its trial in this country are surely not insuperable.

I am, Sir, yours faithfully,
GORDON W. GOODHART.

Warwick Gardens, Kensington, Jan. 11th, 1923.

SOLUBILITY OF EMETINE-BISMUTH-IODIDE.

To the Editor of THE LANCET.

SIR,—I notice Major P. M. Rennie, in his paper on the Treatment of Amœbiasis in your issue of Dec. 30th, 1922 (p. 1374), says emetine bismuth iodide (E.B.I.) is insoluble in dilute acid and that it passes through the stomach unchanged. May I say this is really not the case. I made experiments on the subject several years ago, and have given my results on p. 517 of the Extra Pharmacopœia (Vol. I.). It is stated there, for example, that if 0·1 g. of E.B.I. be shaken with 200 c.cm. of 0·2 per cent. hydrochloric acid, an opalescent liquid is formed containing bismuth as oxychloride and *emetine in solution*. The solubility of the alkaloidal portion of the compound in physiological acid, especially at body temperature, completely upsets the theory under which the compound was introduced.—I am, Sir, yours faithfully,

W. H. MARTINDALE, Ph.D.

10, New Cavendish-street, London, W. 1, Jan. 10th, 1923.

SULFARSENOL IN THE TREATMENT OF SYPHILIS.

To the Editor of THE LANCET.

SIR,—May I be permitted to comment upon Mr. F. C. Doble's interesting article with this title, which appeared in THE LANCET of Jan. 13th.

Mr. Doble mentions that certain cases of syphilis which reacted badly to other arsenobenzol compounds were refused other treatment than mercury and pot. iod. by certain syphilologists, and that the situation was saved with sulfarsenol. One might conclude that this drug was the only remedy. I am sure many will agree with me that the difficulty can be overcome otherwise. I have repeatedly counteracted these bad effects by making the patient avoid exposure to cold, allowing a certain amount of food before the injection, and by giving contramine intramuscularly.

I have also found contramine exceedingly useful in the complications of acute gonorrhœa, in fact, it is almost specific in aborting acute epididymitis and prostatitis. If sulfarsenol acts likewise then I would think it is by virtue of its sulphur radicle. In that case contramine is the safer remedy.

I am, Sir, yours faithfully,
Harley-street, W., Jan. 13th, 1923. M. W. BROWDY.

AN ALIEN ASTHMA CURE.

To the Editor of THE LANCET.

SIR,—I wish to inform the editorship of THE LANCET that I have heard through the managing director of the Olpena, Ltd., London, S.W. 1, 35, Duke-street, that it has been said in two or three publications of THE LANCET that the editorship has not been able to find my name in the German medical registers. I am herewith informing the editorship of THE LANCET, of which I am not a reader, that I am physician-general (out of service) of the Imperial German Navy, and it might be known to THE LANCET that in the ranks of our Imperial Navy only and solely first-rate physicians were taken up. If the editorship would take the pains to look for my name in the annual sets 1899–1918 of the lists of the Imperial German Navy they are sure to find the same in every annual set. During the last period of my active service I had the honour of being division-physician of the second division of the German Navy in Flanders, and have only taken my leave owing to the breaking out of the German revolution. I hope that these statements will suffice THE LANCET, and that it will make haste to set right the remarks about my name.

I am, Sir, yours faithfully,
DR. HANS ROHDE,
Düsseldorf, Jan. 13th, 1923. Marine-Generalarzt a.D.

*** Fleet-Surgeon Rohde has been misinformed. In the circular in which he was stated to be in charge of a treatment centre in London he was described as "a specialist in bronchial diseases." We said (once only) that we had failed to find his name on the *British* Medical Register, or in any book of reference containing the names of German *specialists*.—ED. L.

Obituary.

JOHN BERRY HAYCRAFT, M.D., D.Sc. EDIN., F.R.S. EDIN.,

EMERITUS PROFESSOR OF PHYSIOLOGY, UNIVERSITY COLLEGE OF SOUTH WALES.

ALL who knew Prof. Haycraft will hear with deep regret of his sudden death at Royston on Dec. 30th last. Throughout his life, and in spite of serious illness, he had steadfastly held the ideal of scientific research before himself; and when he resigned his chair at Cardiff in 1920 it was in the hope that he would be able to continue his investigations in his retirement. For a time his health improved, and his friends hoped that he would be enabled to enjoy many years in the quiet pursuit of physiological problems. But this was not to be.

John Berry Haycraft was born in 1857, educated at Brighton Grammar School, and entered on a medical course at Edinburgh University, where he obtained the gold medal for his M.D. thesis in 1888; in the same year he took his D.Sc. After studying in

Leipzig he was appointed to the chair of physiology at Mason College, Birmingham. He was, for a short time, interim professor at Edinburgh during Prof. Rutherford's illness; and, on Rutherford's resumption of his duties, in 1894 he became the first professor of physiology at University College, Cardiff. During his tenure of this chair from 1894 to 1920 he saw the gradual development of the Medical School, retiring, in fact, only a few months before the reconstitution of the school as the Welsh National School of Medicine. Haycraft's vigorous insistence upon the necessity of a thorough scientific basis in medical education did much to mould the future development of the school, and its present organisation—with its six years of medical study, restriction of its medical degrees to students who have first attained a degree in science, and whole-time professors in the clinical subjects—owes much to his foresight. His advocacy of modern ideals of teaching and research may not have been popular in all circles, but was no mean factor in determining the course of events.

Perhaps the greatest monument to Prof. Haycraft's activities is the magnificent Physiology Institute which had just been completed before his retirement. He was fortunate in finding a munificent patron in Sir William James Thomas, and an exceptional architect in the late Colonel Bruce Vaughan, who went to endless trouble in visiting other laboratories whilst designing the Cardiff Institute. The result of this collaboration was an institute which is amongst the largest, if not actually the largest, in this country, as it is also one of the most satisfactory in design.

The best known of Haycraft's contributions to physiology is his work upon the cross-striation of skeletal muscle (1881 and 1891). He made casts of skeletal muscle fibres by pressing them upon collodion films, and he found that the impression left upon the film had the same cross-striated appearance as the muscle fibre itself. From this he concluded that the cross-striated appearance is an optical phenomenon due to different refractive effects of the globular and restricted portions of muscle fibrils which are varicose in shape. He contributed articles upon Animal Mechanics, the Sense of Taste, and the Sense of Smell to Schafer's great text-book of Physiology; and his subject for the Milroy Lectures of 1894 was "Darwinism and Race Progress." These were, however, but a small part of his contributions to science. To name but a few of the subjects which he investigated is to show the range of his interests: The results of temperature variations; the chemistry of the blood; the cell-walls of hepatic cells; a theory of amœboid movement; limitations in time of conscious sensations; action of a secretion obtained from the medicinal leech on the coagulation of the blood; nature of the objective cause of sensation; taste; smell; reflex spinal scratching movements; coagulation of the blood; ciliated epithelium; chromatology of the bile; nature of a voluntary muscular movement; vision. Amongst his longer papers were several upon the physiology of the heart; the cause of the first sound; the movements of the heart within the chest cavity; the time of contraction of the papillary muscles (with Paterson); the changes in shape of the heart (with Paterson): and other papers on luminosity; rapid voluntary movements; the elasticity of animal tissues; the blind spot; and the development of the kidney.

Throughout his life Prof. Haycraft showed himself a man of vision, determination, and high scientific ideals, qualities of which the Cardiff Physiology Institute is a fitting memorial. His friends will remember that these qualities survived undimmed an illness which incapacitated him (as it did Pasteur) in the middle years. They will remember him for this, and because he never did a mean thing.

Prof. Haycraft was thrice married. He leaves a widow and two sons, one of whom bears his father's name and is on the surgical staff of the Prince of Wales's Hospital, Cardiff, and assistant in the surgical unit of the National School.

Medical News.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—At a quarterly meeting of the Council of the College held on Jan. 11th, Sir Anthony Bowlby, the President, in the chair, the undermentioned diplomas were conferred (in conjunction with the Royal College of Physicians of London) upon the following candidates:—

DIPLOMA OF M.R.C.S.

Marjorie Broadbent, Royal Free; B. W. Roffey, St. Mary's; and Marguerite A. M. Xavier, Royal Free.

A report was read from the secretary to the Conjoint Examining Board respecting candidates found qualified for the diploma in Public Health, and diplomas were granted (conjointly with the Royal College of Physicians) to the following 24 candidates.

DIPLOMA IN PUBLIC HEALTH.

W. M. Binning, Univ. Coll.; M. C. Brereton, Edinburgh and Univ. Coll.; H. Brookman, St. George's and Middlesex; Alida Charlotte Burt, Dublin and Univ. Coll.; G. W. Cheater, Charing Cross and Roy. Inst. Public Health; D. Clyde, Glasgow and Univ. Coll.; E. Cotter, Dublin and Royal Army Med. Coll.; A. J. Cronin, Glasgow; J. A. A. Duncan, Edinburgh and Middlesex; G. D. English, Edinburgh and Roy. Inst. Public Health; Dorothy W. Gowers, Royal Free and Univ. Coll.; C. M. Gwillim, St. Bart.'s; G. Habgood, Cambridge and London; C. E. E. Herington, St. Bart.'s; A. N. Kingsbury, Middlesex; T. McClurkin, Belfast and Univ. Coll.; J. W. Mann, Aberdeen and Univ. Coll.; K. Nain, Punjab and Univ. Coll.; C. C. Okell, Cambridge and Guy's; R. R. Scott, Durham and Middlesex; J. Singh, Punjab and Univ. Coll.; R. M. Soames, Cambridge and St. Bart.'s; Elsie Stansfeld, Cardiff and Royal Free; and E. W. L. Thomas, St. Bart.'s.

A report was read from the secretary to the Conjoint Examining Board respecting candidates found qualified for the diploma in Tropical Medicine and Hygiene, and diplomas were granted to the following 13 candidates mentioned in the report.

DIPLOMA IN TROPICAL MEDICINE AND HYGIENE.

W. T. Benson, Edinburgh; T. L. Bomford, St. Bart.'s; O. T. Brosius, U.S.A.; C. A. Calder, Edinburgh; G. Covell, Guy's; B. C. Dasgupta, Calcutta; Helen Gregory, Edinburgh; W. H. Hamilton, St. Bart.'s; H. A. Hewat, Edinburgh; M. J. Holgate, St. Bart.'s; K. Nain, Punjab; C. G. Pandit, Bombay; and C. J. H. Sharp, Univ. Coll. (All these candidates studied at the London School of Tropical Medicine.)

A report was read from the secretary to the Conjoint Examining Board respecting candidates found qualified for the diploma in Psychological Medicine, and diplomas were granted to the following 13 candidates jointly with the Royal College of Physicians.

DIPLOMA IN PSYCHOLOGICAL MEDICINE.

Mary Barkas, National and Bethlem Hosps.; S. Blanton, Cornell; N. H. Clubwala, Maudsley and Bethlem Hosps.; J. Gifford, Bethlem; G. W. Greene, Claybury Ment. Asylum; F. H. Guppy; E. L. Hopkins, Bexley Ment. Hosp.; P. D. Hunter, Arlesly Ment. Hosp.; P. McLuskie, Maudsley and Colney Hatch; N. W. Markwell, Bethlem; N. Roberts, Horton and Ewell Ment. Hosps.; W. D. Sammon, Colney Hatch; and C. E. A. Shepherd, Maudsley and Epsom Ment. Hosps.

A report was read from the Committee of Management, and the revised regulations for the diploma in Public Health were approved and adopted.—Sir W. Thorburn was nominated to serve on the Council of Queen Victoria's Jubilee Institute for Nurses, as representative of the College, for three years from March 1st, 1923, in the vacancy occasioned by the expiration of the period of office of Sir Charters J. Symonds.

The lecture arrangements of the College for January and February have been issued. The dates and subjects are as follows:—Jan. 29th: Osteitis Fibrosa, by Prof. R. Lawford Knaggs; Jan. 31st: Malignant Disease of the Upper Jaw with Special Reference to Operative Technique, by Prof. Musgrave Woodman; Feb. 2nd: The Metastatic Tumours of Bone, by Prof. Cecil A. Joll; Feb. 5th: The Relation of Diseases of the Gall-bladder to the Secretory Function of the Stomach and Pancreas, by Prof. H. Ernest Griffiths; Feb. 7th: Chronic Mastitis, by Prof. Geoffrey Keynes; Feb. 9th: Remote Effects of Gunshot Wounds of the Head, by Prof. L. Bathe Rawling; Feb. 21st: The Flow of Lymph from the Ileo-cæcal Angle and its Possible Bearing on (1) the Formation of Gastric and Duodenal Ulcer, and (2) the Cause of Other Types of Indigestion, by Mr. R. L. Braithwaite; Feb. 23rd: Abnormalities of the Hepatic and Cystic Arteries and Bile Ducts, by Mr. E. R. Flint. All these lectures will be delivered at 5 P.M. On Feb. 14th, the Hunterian oration will be delivered at 4 P.M. by Sir John Bland-Sutton. Admission to all lectures is free.

UNIVERSITY OF LIVERPOOL.—At examinations held recently the following candidates were successful:—

DIPLOMA IN PUBLIC HEALTH.

Christine C. Abernethy, Esther Ashworth, A. E. I. Connolly, C. E. Freeman, and A. Speight.

ROYAL INSTITUTION OF GREAT BRITAIN.—The Friday evening discourse on Jan. 26th will be delivered at 9 P.M. by Sir Almroth Wright, F.R.S. The subject is the Machinery of Anti-Bacterial Defence. On Jan. 23rd, at 3 P.M., Prof. F. G. Donnan, F.R.S., will give a second lecture on Semi-Permeable Membranes and Colloid Chemistry.

ASSOCIATION OF ECONOMIC BIOLOGISTS. — The annual general meeting of the Association will be held at 2.30 P.M. on Jan. 26th, in the Botanical Lecture Theatre of the Imperial College of Science, Prince Consort Road, South Kensington, London, S.W. 7, when Prof. R. T. Leiper will give an address on the Study of Helminthology.

LONDON HOSPITAL MEDICAL COLLEGE.—A course of eight lectures on the Mathematical Basis of Physiological Problems will be given by Dr. W. A. M. Smart, at 4.30 P.M., on Jan. 18th and 25th, Feb. 1st, 8th, 15th, 22nd, and March 1st and 8th. Attendance at this Course is recognised in connexion with the B.Sc. (Honours) Degree in Physiology. Admission to these lectures is free without ticket.

THE LATE DR. W. C. STEEN.—Dr. William Carmichael Steen died at Letchworth, Herts, on Jan. 4th, in his sixtieth year. He was the eldest son of the late Dr. Robert Steen, of the Royal Belfast Academical Institution. Dr. Steen qualified from the Royal University of Ireland, where he became M.D., M.Ch. in 1886, and practised at Owston Ferry, Lincolnshire, and at Belfast. For many years he was laid aside from active work by spinal caries, and he bore his long illness with patience and cheerfulness. Among his many occupations must be included the work that he did for the library for the blind. He not only mastered the difficulties of Braille and transcribed books by this method but was a recognised instructor in the subject. He married in 1900 Margaret, youngest daughter of the late William Eaden Lilley, of Cambridge, who survives him.

ROYAL MEDICAL BENEVOLENT FUND.—At a recent meeting of the committee 31 cases were considered and £417 granted to 29 applicants. The following is a summary of some of the cases relieved:—

M.R.C.S., L.R.C.P. Lond., aged 67, married, four children, who practised at Bury St. Edmunds and latterly has taken locums. He is at present unable to obtain any work, principally through old age. His wife and family live in the Isle of Wight and applicant is staying in London to be near the medical agents. An emergency grant of £5 was given to help to keep him, and a further £15 was voted at the meeting.

Son (aged 18) of M.R.C.S., L.S.A. Lond., M.D. Father now insane. Applicant is now at a training college in Switzerland, and a further 18 months is required to complete the training. The friends are willing to contribute a sum of £50 if the Fund could supply a similar sum. The Fund voted the sum of £25 and the R.M.B.F. Guild contribute the balance.

Daughter (aged 23) of M.R.C.S. Eng. and L.R.C.P. Edin. who practised at Stockton-on-Tees and died in 1920. Applicant for some time has been engaged as a clerk, but finding that there would be some reduction of staff she took this opportunity to enter a hospital as probationer nurse. She asked the Fund to help her to purchase outfit. The sum of £7 2s. 2d. was paid by the R.M.B.F. Guild, and the Fund voted the sum of £4 towards this amount.

Widow (aged 40) of M.B. Lond. who practised at Richmond and latterly held public appointments and died in 1918. Applicant was left to provide for her two children, aged 9 and 7, and asked for help towards education, but as her income is in excess of the condition of help from the Fund they voted the sum of £1 to qualify her for assistance from the R.M.B.F. Guild in helping to get the son into Epsom when old enough.

Widow (aged 45) of M.B., C.M. who practised in Guildford and died in January, 1922. After the husband died the practice was sold, and when funeral expenses and debts were paid there was only £120 left for applicant and three sons. This case received grants from the War Emergency Fund, and at present this Fund is paying the sum of £45 for one year's school fees for the youngest son. Another fund is helping with the maintenance grant, and the current expenses of the 12 months has reduced the applicant's balance to £30. The older son is a clerk, who earns £100 per annum, out of which he gives his mother £40 towards his keep. The rent of a small flat amounts to £78 per annum. Voted £18 in 12 instalments.

Daughter (age 66) of M.D. Lond. who practised at Notting Hill and died in 1885. This applicant was able until recently to earn money at needlework, but owing to ill-health and failing eyesight had to give it up. She was granted by the Fund in March, 1922, £26 in 12 instalments. This case was chosen as the most deserving to receive a special grant of £1, which has been given to the Fund for a suitable unmarried grantee.

Subscriptions may be sent to the Hon. Treasurer, Sir Charters Symonds, K.B.E., C.B., M.S., at 11, Chandos-street, Cavendish-square, London, W. 1.

A WINDOW has been erected in St. Mary's Church, Ticehurst, Sussex, to the memory of Dr. Herbert Francis Hayes Newington who died in the summer of 1917.

IVORY CROSS DINNER.—A dinner in aid of this charity, which provides dental treatment for those who are really poor in every class of life, will be held at the Hotel Victoria, Northumberland-avenue, London, W.C., on Feb. 9th. Tickets (£1 1s.) may be obtained from Miss Fletcher, Hon. Secretary, 10, Henrietta-street, London, W. 1.

FOREIGN DECORATIONS.—The King has granted permission to Dr. A. Granville, C.M.G., C.B.E., President of the Sanitary Maritime and Quarantine Council of Egypt, to wear the Cross of Commander of the Order of Leopold II., and to Dr. J. M. Coplans, to wear the Cross of Chevalier of the Order of the Crown, conferred on them by the King of the Belgians in recognition of valuable services during the war.

THE PROPOSED TESTIMONIAL TO DR. BYROM BRAMWELL.—A Provisional Committee has been formed to mark in some definite and, if possible, permanent manner the high esteem felt for Dr. Bramwell by many members of the medical profession on the occasion of his seventy-fifth birthday. The names of the Provisional Committee are Sir Clifford Allbutt, Sir Thomas Barlow, Sir James Crichton-Browne, Sir Dyce Duckworth, Sir Frederick Mott, Sir Robert Philip, Sir James Purves-Stewart, Sir David Drummond, Prof. Lovell Gulland, Dr. Robert Hutchison, Mr. H. J. F. Simson, Dr. S. A. K. Wilson, Dr. J. Brunton Blaikie, Dr. G. H. Rae Gibson, and Dr. F. N. Kay Menzies (Hon. Secretary and Treasurer). Several suggestions have been made as to the form which the presentation should take—e.g., a portrait by a well-known artist—and the Committee is prepared to receive other suggestions. It is proposed to limit subscriptions to a maximum of £5, but any subscription, however small, will be welcomed. Subscriptions should be sent to Dr. Menzies, 37, Egerton-gardens, London, S.W. 3.

A DUBLIN SURGEON KIDNAPPED.—Our Irish correspondent writes: Mr. O. St. J. Gogarty, the Dublin throat surgeon and a member of the Senate of the Irish Free State, had an unpleasant adventure on the night of the 12th inst. On that evening a party of armed men called at his residence and informed him that they required his professional assistance for a patient who was seriously wounded. Forcing him into a motor-car and blindfolding him they then drove to a house just outside Dublin, between Island Bridge and Chapelizod on the river Liffey. He was left in a room under an armed guard. After a little time he asked permission to withdraw to the garden. This was granted, an armed man still guarding him. Removing his overcoat, and making a feint of handing it to the guard, he succeeded in throwing it over the head of the latter and momentarily disabling him. Mr. Gogarty dashed through a shrubbery and plunged into the Liffey. Swimming down stream for some time he reached the bank and ultimately succeeded in reaching the Depôt of the Civil Guard in the Phœnix Park little the worse for his night's adventure. It is supposed that Mr. Gogarty, as a senator, was seized as a hostage for one of the Republican leaders who has recently been on his trial. His professional brethren congratulate him on his escape, which was due to his own remarkable courage and resource.

PEOPLE'S LEAGUE OF HEALTH.—The Sims Woodhead series of constructive educational health lectures will be given at the headquarters of National Union of Teachers, Hamilton House, Mabledon-place, London, W.C. 1, on Wednesday at 6 P.M., during January, February, and March. At the conclusion of the series there will be an optional examination, and certificates issued by the Medical Council of the People's League of Health, with a travelling scholarship prize award consisting of a week's visit to a foreign country, with facilities for visiting its health centres. The first lecture was held on Jan. 17th, when Prof. T. B. Johnston gave an address on the Anatomy and Physiology of Bones and Muscles and Internal Organs. On Jan. 24th Prof. M. S. Pembrey will deal with the Anatomy and Physiology of the Circulatory and Respiratory Systems. On Jan. 31st Sir Frederick Mott, F.R.S., will lecture on the Brain and Nervous System. On Feb. 7th Sir Harry Baldwin will speak on the Teeth, and on Feb. 14th Prof. W. Halliburton, F.R.S., on Food. Prof. E. H. Starling, F.R.S., will lecture on Digestive Organs and Lymphatic Glands on Feb. 21st, and on Feb. 28th Sir William Arbuthnot Lane will discuss Sewage Systems of the Human Body. The lectures on March 7th, 14th, and 21st will be delivered by Prof. H. R. Kenwood, Mr. E. B. Turner, and Dr. A. F. Tredgold, respectively, on Hygiene, Recreation and Physical Exercise, and Development and Function of Mind. The fee for the series will be 10s. Tickets can be obtained from the Hon. Organiser of the League, 12, Stratford-place, London, W. 1.

EASTBOURNE HOSPITAL.—By means of the Penny-a-Week Fund, which was inaugurated at Eastbourne some years ago to help the local hospitals by the collection of pennies, the sum of £968 was raised during 1922, an advance on the previous year of £95.

THE LATE DR. J. D. DICKSON.—Dr. John Dunbar Dickson, who died on Jan. 13th, aged 70, was educated at Queen's College, Belfast, and graduated M.D., M.Ch. R.U.I., in 1876, taking in the same year the L.R.C.S.I. and the L.M. of the Rotunda Hospital. After holding various house appointments in Ireland, at the Darlington Hospital, the Bucks General Infirmary, and the Ripon Dispensary, he became a partner in a practice at Marlow from which he retired in 1914, though he resumed work during his successor's absence on war service. For many years he was medical officer of health to the Marlow Urban District Council and to the Wycombe Rural District Council, and was also assistant school medical officer for Marlow. Dr. Dickson took a keen interest in local affairs: he was a member of the Bucks Insurance Committee and a founder of the Bucks Cottage Hospital, on the staff of which he served. He was appointed a justice of the peace in 1906.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Monday, Jan. 22nd.

ODONTOLOGY: at 8 P.M.
Discussion:
On Dental Sepsis as an Ætiological Factor in Disease of Other Organs.
To be opened by Sir William Willcox.

Tuesday, Jan. 23rd.

MEDICINE: *at University College Hospital, Gower-street, W.C. Clinical Meeting* at 5.30 P.M. (Tea will be provided at 5 P.M.)

Thursday, Jan. 25th.

UROLOGY: at 8.30 P.M.
Clinical and Pathological Meeting.
Cases and Specimens will be shown by—
Sir John Thomson-Walker: (1) A Cyst of the Prostate. (2) A Growth of the Epididymis. (3) An Aberrant Lobe of the Prostate. (4) Case of Malakoplakia (Mr. F. R. F. Barrington).
Mr. W. Girling Ball: (1) Ligature of Abnormal Renal Artery with Necrosis of the Kidney. (2) Papilloma of the Kidney. (3) An Absent Kidney with Congenital Deformity of the Opposite Side.
Dr. W. G. Sutcliffe: Case of Large Calculus from the Male.
N.B.—Will Members desiring to show specimens kindly notify Mr. Girling Ball, 77, Wimpole-street, W., as soon as possible.

Friday, Jan. 26th.

STUDY OF DISEASE IN CHILDREN: at 5 P.M. (Cases at 4.30 P.M.)
Special Clinical Meeting to be devoted to the exhibition and discussion of cases showing the late results of Encephalitis Lethargica.

NEUROLOGY:
Members of this Section are especially invited to show cases and take part in the meeting.
Jenner Centenary.
Sir William Hale-White will given an Address on Jenner and his Work at 8.30 P.M.
An oil painting of Jenner by Hobday, presented to the Society by Dr. W. S. A. Griffith, will be on view, and Mr. C. J. S. Thompson, of the Wellcome Historical Medical Museum, has kindly offered to show a collection of relics and exhibits connected with Jenner.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.
MONDAY, Jan. 22nd.—8.30 P.M.: Discussion on Clinical Results of Treatment of Malignant Disease by X Ray—introduced by Dr. Robert Knox, followed by Mr. Hayward Pinch, Dr. Reginald Morton, Mr. Sampson Handley, Dr. Douglas Webster, Dr. J. E. A. Lynham, and others.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY, Jan. 22nd.—11 A.M., Mr. Maingot: Surgical Ward Cases. 12 noon, Mr. Simmonds: Applied Anatomy. 4 P.M., Mr. Bishop Harman: Congenital Defect of the Eyes.
TUESDAY.—11 A.M., Dr. Paterson: Demonstration of Medical Cases. 12 noon, Dr. Burrell: Chest Cases. 2.30 P.M., Mr. Tyrrell Gray: Surgical Wards.
WEDNESDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 12 noon, Dr. Burnford: Pathological Demonstration. 2.30 P.M., Mr. Armour: Surgical Wards.
THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Department. 12 noon, Mr. Simmonds: Demonstration of Fractures. 4 P.M., Dr. McConnel Wanklyn: Small-pox Diagnosis.
FRIDAY.—12 noon, Dr. Flett: Radiology. 2 P.M., Mr. Banks-Davis: Diseases of Throat, Nose, and Ear. 3 P.M., Mr. Sinclair: Surgical Cases.
SATURDAY.—9 A.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 11 A.M., Mr. Maingot: Surgical Pathology.
Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M.: In-patients, Out-patients, Operations, Special Departments.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, Bloomsbury, W.C. 1.
POST-GRADUATE COURSE: JAN.–MARCH, 1923.
CLINICAL LECTURES AND DEMONSTRATIONS.
MONDAY, Jan. 22nd.—2 P.M., Out-patient Clinic: Dr. Hinds Howell. 3.30 P.M., Lecture:—Tabes Dorsalis and its Treatment: Dr. James Taylor.
TUESDAY, Jan. 23rd.—2 P.M., Out-patient Clinic: Dr. Grainger Stewart. 3.30 P.M., Lecture:—Myopathy: Dr. Adie.
THURSDAY, Jan. 25th.—2 P.M., Out-patient Clinic: Dr. Kinnier Wilson. 3.30 P.M., Lecture:—Tonic Fits and Allied Forms of Generalised Muscular Spasms: Dr. Walshe.
FRIDAY, Jan. 26th.—2 P.M., Out-patient Clinic: Dr. Gordon Holmes. 3.30 P.M., Lecture:—Friedreich's Ataxia: Dr. Saunders.
Mr. Armour and Mr. Sargent operate at the Hospital on Tuesday and Friday mornings at 9 A.M., or at such other times as may be announced.
NEURO-PATHOLOGY.
MONDAY, Jan. 22nd.—12 noon, Cerebro-Spinal Fluid: Dr. J. Godwin Greenfield.
N.B.—A Course of Lectures in the Anatomy and Physiology of the Nervous System will be given if there are sufficient entries for it.
The fee for the whole Course, including Anatomy and Physiology, is £12 12s., but these Lectures may be taken separately for a fee of £4 4s. Course without Anatomy and Physiology Lectures will be £10 10s. Any part of the Course may be taken separately at a special fee. Special arrangements will be made for those unable to take the whole Course. Fees should be paid to the Secretary of the Hospital at the office on entering for the Course.
C. M. HINDS HOWELL, Dean of Medical School.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY, Jan. 25th.—4 P.M., Mr. Fairbank: Fractures About the Elbow-joint and Their Complications.

ST. JOHN'S HOSPITAL, 49, Leicester-square, W.C.
THURSDAY, Jan. 25th.—5 P.M., Dr. W. Griffith: Diseases of the Skin Appendages.

ST. MARY'S HOSPITALS POST-GRADUATE LECTURES (Whitworth-street West Branch).
FRIDAY, Jan. 26th.—4.30 P.M., Dr. C. P. Lapage: The Exudative Diathesis in Children. (Eczema, Urticaria, Hay Fever, and Asthma.)

MANCHESTER FRENCH HOSPITAL, 24, Acomb-street, Whitworth Park.
THURSDAY, Jan. 25th.—4.30 P.M., Dr. N. C. Haring: Clinical Demonstration of Cases of Tuberculosis of the Lungs.

MANCHESTER CLINICAL SOCIETY.
Clinical Meeting at the Skin Hospital, Quay-street.
THURSDAY, Jan. 25th.—4.30 P.M.

Appointments.

HUMPHERY, G. P., M.B., C.M. Edin., has been appointed Certifying Surgeon under the Factory and Workshop Acts for Brandon, Suffolk.

Ingham Infirmary, South Shields: GOGGIN, J. J., M.B., B.Ch., B.A.O., Senior House Surgeon; LITTLE, R. C., Junior House Surgeon.

Vacancies.

For further information refer to the advertisement columns.

Barnsley, Beckett Hospital and Dispensary.—Sen. H.S. £300.
Birmingham City.—Research Officer. £500.
Birmingham General Hospital.—Two H.P.s. £70.
Bristol General Hospital.—Hon. Phys. Accoucheur. Also Asst. Phys. Accoucheur.
Bristol Mental Hospital.—Asst. M.O. and Pathologist. £400.
Cape Town, City of.—M.O.H. £1500.
City of London Hospital for Diseases of Chest, Victoria Park, E.—Asst. M.O. £100.

Colchester, Essex County Hospital.—Cas. O. and Path. £200.
Croydon County Borough.—M.O.H. £1300.
Dreadnought Hospital, Greenwich.—H.P. £150. Also S. for Dis. of Throat, &c.
East Ham Education Committee.—Part-Time Ophth. S. £3 3*s.* per session.
East London Hospital for Children and Dispensary for Women, Shadwell, E.—H.P. £125.
Elizabeth Garrett Anderson Hospital, Euston-road, N.W.—Hon. Clin. Assts. Also Asst. to Clin. Pathologist. £100.
India, Countess of Dufferin's Fund, Women's Medical Service.—Two Med. Women. Rs.450 p.m.
Kidderminster Infirmary and Children's Hospital.—H.S. £150.
Liverpool Eye and Ear Infirmary.—Hon. Asst. S.
Liverpool Maternity Hospital and Ladies Charity.—Hon. S.
Liverpool Royal Children's Hospital.—Two Res. H.P.'s and Two Res. H.S.'s. Each £90.
London Homœopathic Hospital, Great Ormond-street, W.C.—Asst. P. for Dis. of Women.
Manchester, Ancoats Hospital.—Hon. Radiologist. £100.
Manchester Royal Eye Hospital.—Jun. H.S. £120.
Margate, Royal Sea Bathing Hospital for Surgical Tuberculosis.—Res. S. and Med. Supt. £500.
Napsbury Mental Hospital.—Jun. Asst. M.O. £546 14*s.*
Northampton County Borough Education Committee.—Asst. Sch. M.O. and Asst. M.O.H. £600.
North Staffordshire Infirmary, Hartshill, Stoke-on-Trent.—H.S. £250.
Norwich, Norfolk and Norwich Hospital.—H.S. £150.
Preston and County of Lancaster Queen Victoria Royal Infirmary.—Res. Surg. O. and H.S. £225 and £200 respectively. Also Hon. M.O. for Obstetric Dept.
Queen Mary's Hospital for the East End, Stratford, E.—Cas. O. £150.
Reading, Royal Berkshire Hospital.—H.P. £200.
Rotherham Hospital.—Jun. H.S. £150.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Pathologist. £200.
Royal Westminster Ophthalmic Hospital, King William-street, Strand, W.C.—Radiologist.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—H.S. £100.
Shoreham, Sussex, Lancing College.—School Doctor. £500.
South London Hospital for Women, Clapham Common, S.W.—Sen. H.S. £100. Also Second H.S. £50.
Staffordshire General Infirmary, Stafford.—H.S. £200.
University College Hospital, Gower-street, W.C.—Asst. in Child Welfare. £50.
University of London.—External Examiners, &c.
Weston-super-Mare Hospital.—H.S. £150.
Whittingham County Mental Hospital, near Preston, Lancs.—Asst. M.O. Also Asst. M.O. Pathologist. Each £449 13*s.*
Wigan Infirmary.—Hon. Asst. Physician.
Worcester County and City Mental Hospital, Powick.—Jun. Asst. M.O. £300.

The Chief Inspector of Factories, Home Office, London, S.W., announces the following vacant appointments: Chapel-en-le-Frith (Derby), Ottery St. Mary (Devon), and Newport (Fife).

Births, Marriages, and Deaths.

BIRTHS.

COX.—On Jan. 15th, at 49, West Cliff, Preston, the wife (née Rita Howarth) of George Lissant Cox, M.A., M.D. (Cantab.), of a daughter.

DENNING.—On Jan. 7th, at Star-hill, Rochester, the wife of Dr. Fredk. A. V. Denning, of a son.

EMANUEL.—On Jan. 13th, at Harborne-road, Edgbaston, Birmingham, the wife of J. G. Emanuel, M.D., F.R.C.P., of a son.

LUXMOORE.—On Jan. 14th, at a nursing home, the wife of Surgeon-Major E. J. H. Luxmoore, 2nd Life Guards, of a son.

RITCHIE.—On Jan. 6th, at The Groves, Malpas, Cheshire, the wife of T. C. Ritchie, M.D., of a daughter.

MARRIAGES.

THOMSON—FRASER.—On Jan. 9th, at St. Margaret's Parish Church, Arbroath, James Ettershank Gordon Thomson, M.C., M.B., Ch.B., to Florence, fourth daughter of Mr. and Mrs. Robert Fraser, Cairnichill, Arbroath.

DEATHS.

DICKSON.—On Jan. 13th at Marlow, Bucks, John Dunbar Dickson, M.D., aged 70.

KEEFER.—On Dec. 27th, 1922, at Toronto, Canada, Major William Napier Keefer, I.M.S., retired.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

THE LANCET: SUBSCRIPTION RATES.

INLAND	One Year	£2 2 0
	Six Months	1 1 0
	Three Months	0 10 6
ABROAD	One Year	2 10 0
	Six Months	1 5 0
	Three Months	0 12 6

Notes, Comments, and Abstracts.

SOME NOTES ON THE TREATMENT OF FRACTURES.[1]

BY SIR W. ARBUTHNOT LANE, BART., M.S. LOND., F.R.C.S. ENG.

FROM the examination in the dissecting room of Guy's Hospital and elsewhere of the bodies of labourers who had been engaged in special occupations for many years, I formulated several laws on which I based the principles involved in the treatment of fractures. Later I applied the same principles to the elucidation of the condition which I called chronic intestinal stasis which, I believe, is the cause of all the diseases which are acquired as the result of civilisation. I will state the several laws as briefly as possible. They are:—

1. The skeleton represents the crystallisation of lines of force. When force is exerted habitually in one direction, bone is laid down as compact tissue, when it is exerted in varying directions it is laid down as cancellous tissue. These cancelli only retain their normal arrangement as long as the joint performs its normal functions, any variation in its range of movement from injury, disease, habit, or occupation being followed by a definite change in the arrangement of the cancellated bone. As regards the compact tissue a similar change ensues when the shaft of a long bone is broken and the ends of the fragments are not accurately opposed, so that the axes of the two portions are not in continuity. In such a case occurring in childhood an entirely new shaft is formed extending along the line of force—namely, from the extremities of the broken bone—any portion of the old shaft outside this line being absorbed. As life goes on the process of crystallisation in a fractured bone becomes more and more limited and localised and is usually described as callus. Even in advanced age, however, the process of formation of bone in the line of force may extend along the entire length of the shaft and be very abundant.

2. The rate of growth of bone in the several portions of an epiphysial line varies inversely as the pressure transmitted through them. This is shown very clearly in the changes that take place in the lower end of the growing femur in knock-knee and in bow legs.

3. Pressure produces changes in the form and function of bones and joints. It may immobilise joints that are normally movable or it may mobilise joints which originally allowed of a very slight degree of movement. It may convert cartilage into bone, as in the case of the first costal cartilages of the labourer and make a movable joint in its length.

4. Strain produces change in the form and function of bones and joints. It tends to convert muscles into tendon, tendon into ligament, and ligament into bone.

5. When apart from the exercise of pressure or strain it is important in the special relationship of the individual to his surroundings that an existing mechanism should be altered or an entirely new one developed such a change takes place.

6. The several organs exert a varying claim upon the bone-forming centre. This is well illustrated in the characteristic thickening of the skull in mollities ossium, rickets, and osteitis deformans.

These laws show that we bear a certain definite mechanical relationship to our surroundings, and that any modification in that relationship is followed of necessity by a corresponding alteration in the structure of the body of the individual. In this way evolution is clearly demonstrated by the extraordinary and extensive changes which take place during the lifetime of an individual from the pursuit of any laborious occupation. They are precisely what one would expect to arise from a study of the variation in the relationship of the mechanics of the individual to his surroundings. They are modified in a very remarkable manner by the vitality of the individual. This is shown by a contrast of the bony changes in the labourer with such as are seen in the skeletons of those affected with lateral curvature of the spine or other resting deformity. Again, even more remarkable differences are observed in the soft parts, as in the case of the abdominal viscera in chronic intestinal stasis. While in the vigorous subject the overloaded bowel becomes fixed by dense strong acquired bands which retain it in position and oppose its distension and prolapse, in the feeble subject no attempt whatever is made to control the distension and prolapse of the large bowel which may become enormously elongated. All this has been described in detail elsewhere. Whether I

[1] Abstracted from an address delivered to the St. Mary's Hospital Medical Society on Jan. 10th.

was justified in assuming the truth of the following law you must decide on the evidence I put forward. It is:—

7. Tendencies to change which cannot produce the result in the parent may do so in the offspring.

If this law is true it is that on which evolution is founded.

Treatment of Fractures of Long Bones.

While pursuing these investigations of the changes which ensue in the various kinds of labourers I found a large number of fractures of the long bones which were quite common in the class that furnished the subjects in the dissecting room. This was accounted for by the fact that the malunion of such fractures involved such an amount of physical depreciation and of wage-earning capacity as to drive the man into the workhouse and thence to the dissecting room. The mode of union of the fragments was almost invariably bad as regards the form and function of the bone. This was particularly noticeable in the fractures of the long bones of the leg.

In order to confirm the extent of the depreciation in wage-earning capacity which ensued from fractures of long bones, and more especially those of the leg, I went to the workhouses, instrument makers, employers of labour, foremen of works, police authorities, and Poor-law officials, when I found that the loss sustained by the labouring class, and especially by those who had to climb on ladders and work on buildings, often in positions of considerable danger, was very great indeed.

On the strength of the information that I had acquired in this way I started in 1892 to operate on all cases of fracture in which it was important to the individual that his anatomy and functions should be restored to the normal if it was impossible to obtain accurate apposition of fragments by means other than operative. At that time the teaching of the text-books is illustrated by the following remarks by Mr. Christopher Heath, the then President of the Royal College of Surgeons of England, one of my most violent opponents. He stated that he "had no hesitation in asserting how important it is, in a fracture of the leg particularly, that the fracture should be set thoroughly and accurately, and unless that is done, and done accurately, the surgeon has not treated the case properly"; and again, "but I cannot conceive how anyone can believe that it is justifiable to convert a simple into a compound fracture, and of this I am quite certain that the majority of surgeons for the present will remain content with the usual methods of treatment."

I have chosen Mr. Heath amongst the large number of surgeons who were so actively opposed to any modification of the treatment of fractures then in use as he occupied an important position in the teaching world and also at the examination table. He, like most surgeons at that time, was strongly opposed to the antiseptic treatment, so that it was perhaps as well that he stuck to the old method which involved no immediate risk to the patient. The several opponents differed widely in the methods which they employed in their treatment. Believing that the chief factor opposing replacement of fragments was the spasmodic contraction of muscles and not as I demonstrated the shortening by hæmorrhage and inflammation of the soft parts which form ties in the length of the long bones, some advised the so-called "setting," a most unfortunate term since it suggests to the public the restoration of the broken bone to its normal form, be postponed till the spasmodic contraction of the irritated and lacerated muscles had subsided in a week or ten days. Others, as for instance, the late Sir Alfred Pearce Gould, took a different view as the following extract shows: "Having arrived at a full and correct diagnosis the next point to attend to is to reduce the fragments at once, at the earliest possible moment, remembering that lapse of time always increases the difficulties in doing this, never lessens them, and even makes them insuperable. The reduction must be complete or perfect at once."

I quote these statements made by two well-recognised authorities since they illustrate the teaching of that time together with the very marked confusion in the minds of surgeons as to the method to be adopted in the treatment of fractures. Every surgeon was agreed that my statements as to the union of fragments in bad position and the consequent depreciation in wage-earning capacity were grossly exaggerated. It was only when X rays had come into use that it was shown that not only were they not exaggerated but that the mechanical conditions were even worse than I had represented.

Feeling became so acute on this subject that at a meeting of the British Medical Association held in London many years ago a demand was made by several members that a committee should be appointed to investigate the accuracy of my statements. The Association willingly undertook the task and a committee was appointed consisting of several distinguished surgeons who carried out the investigation very thoroughly at the cost of much time and money. The report, which was published by the Association, fully bore out the truth of my statements and was far-reaching in its importance. I have followed with complete success the method of treatment that I laid down in 1893, modifying it only slightly in the form of the materials used to retain the fragments of the broken bone in position. This method has been widely adopted, and when the surgeon has possessed mechanical skill and judgment, together with a perfect technique, the best possible results have been obtained. Unfortunately many operators have not possessed these qualifications and much harm has resulted partly from their inability to replace the fragments in position, or to secure them efficiently, or from sepsis. This last fault especially has led to serious trouble such as death, amputation, and the removal of plates from infection of the wound. As is natural, these operators did not attribute their failures to their own want of skill but preferred to lay the blame on the operation. They modified the form and structure of the plates, they altered the shape of the screws and screw-drivers, used plates made of bone, &c., with no particular advantage. As usual, the surgeon forgot the principle in detail. It is fortunate that in this form of surgery, unlike operations on the soft parts, the surgeon is able to show results capable of ocular demonstration by means of radiography, so that failures in procedure cannot be hidden as are so many others in surgery.

The difficulties experienced in dealing with recent simple fractures are trivial as compared with those which are met with in the restoration to their normal form of bones whose fragments have united in bad positions. In some cases the difficulties are quite insuperable. The skill and judgment required in old fractures of two bones such as the radius and ulna or the tibia and fibula may often be very great. A serious obstacle to union in old-standing cases results from change in the form of the displaced extremities of the fragments in the sclerosing process which they undergo. When gaps had to be filled up I employed in my earlier operations the bones of cats. These remained in position, acting as splints but apparently taking no active share in the formation of bone. Later I used pieces of bone cut from the fractured bone or from some other bone in the patient's body.

Most of the misfortunes which are met with in the treatment of fractures are due to the fact that the surgeon is satisfied to make an attempt to what is called "set" the fracture with or without an anæsthetic, not confirming the result of this process by radiography, too often with no advantage whatever to the patient. I have seen very many cases of fracture that have been put under an anæsthetic and have presumably been manipulated in some manner. The limb has then been put up in a splint and the patient assured that a perfect result would ensue. Many surgeons are wonderfully and unjustifiably optimistic in their prognosis of the results of the treatment of fractures by this method. In very few if any of the cases that have come under my observation have the fragments been replaced in position; indeed, as far as I could judge, in most of them little or no change had been effected in the relationship of the fragments to one another by the treatment to which they had been subjected. Of course it is quite open to anyone to say that the cases that came under my observation were exceptional, but I very much doubt it.

Another frequent source of trouble is that many radiograms taken at quite important institutions are worse than useless and afford very little accurate information. Too often they allow the surgeon to overlook injuries which are not clearly shown in them and to let matters drift till it is too late to interfere with the best advantage to the patient.

Obsolete Teaching.

Unfortunately much of the old and now scientifically obsolete treatment is still in common use even in our large teaching hospitals and in general practice, in consequence of which, in my opinion, no class of case receives worse treatment than do simple fractures. In my earliest paper I asserted that "the treatment of fractures as it exists at present is a disgrace to surgical practice," and now I have little hesitation in repeating the statement. This is so well recognised by the more intelligent practitioner that he regards a fracture as a most undesirable case, feeling that, through no fault of his own, he may be dragged into a court of law and mulcted in heavy damages. It has been my good fortune on several occasions to have been able to dissuade a patient from taking action against his medical attendant for the result of a fracture treated, I regret to say, too often very carelessly. Radiography has placed a powerful weapon in the hands of our patients, and in time they will be less easily satisfied. My experience would suggest that, except in the hands of a very few expert surgeons, little improvement has taken place in the treatment of fractures in spite of the advantages afforded by radiography.

The blame for all this does not lie with the practitioner but with the surgical staffs of the large teaching institutions; this is aggravated by the absence of any efficient training of the students in mechanics. The mode of teaching the

mechanics of the skeleton and soft parts is most defective. While endless time is spent in the study of minute details in the structure of the several parts of the body, usually of no practical importance to the practitioner and therefore fortunately soon forgotten, the business or function of the component parts of the most elaborate mechanism of the human body, complex when normal but vastly more intricate when its form and function are modified by injury or disease, is treated most casually or often incorrectly, or it is completely neglected. On looking back at the amount of useless rubbish that comprised one's so-called medical education one is amazed that it should still continue.

A SILKWORM-GUT HOLDER.

To the Editor of THE LANCET.

SIR,—Everyone familiar with casualty work knows the need of a silkworm-gut holder which will deliver each piece separately. The following simple device has given every satisfaction. A lead weight is taken and two grooves are scored in it. A loop of stout silver wire is hammered into the grooves. The ends of the loop are bent and into these hooks is wedged the gut encircled by a rubber band. The elasticity of the rubber allows of each strand being drawn out singly. An elaboration of this idea, whereby plated steel hooks and an encased lead stand are used, is readily made at small cost by instrument-makers.

I am, Sir, yours faithfully,

A. P. BERTWISTLE.

Jan. 8th, 1923. R.S.O., General Infirmary, Leeds.

WELFARE WORK IN INDIA.

WELFARE work among industrial women and child workers is developing in certain parts of India. For instance, in Bombay City, in Ahmedabad, and in Sholapur, there are special medical dispensaries in the cotton mills for women workers and their children, under the care of women doctors or nurses. In addition, creches or day nurseries are organised in the mill compounds. In certain mills, in addition, a scheme of maternity benefit has been established. At Nagpur, sewing classes and health talks are held for the mothers in the intervals of their work, and a midwifery service has been started. In certain cases special provision is being made for the wives of men workers, with the object of promoting settled labour conditions. Under the direction of the Welfare Organiser of the British Indian Corporation at Cawnpore, preventive medical work is carried on by a woman doctor and nurses. Infant welfare centres have been established at Bombay, at Delhi, at Madras, and Bangalore.

The need for further effort to advance industrial welfare is emphasised in a communication to the *Indian Medical Gazette* of November, 1922, by Dr. Dagmar F. Curjel, W.M.S. In each of the jute and cotton mills around Calcutta, a doctor-babu and a dispensary may be found, but relatively few women workers come for treatment and those only for accidents or general complaints. For the special diseases of women and young children hardly any relief is given. Midwifery cases are still conducted by the indigenous *dai* or untaught midwife. On the other hand, the appointment of a nurse in a jute mill has led to over 2000 visits from women workers and children in the first six months, and she has been able to persuade women who needed doctor's treatment to come with her to the mill doctor. Dr. Curjel pleads for the establishment of nurse-midwives or health visitors, and the institution of creches. The cost, compared with the sums expended by mills on the sanitation of their compounds, would be small, and she considers it would be profitable expenditure.

The chief difficulty is in the matter of personnel, since rigid standards cannot be enforced and a wide tolerance, sympathy with native customs and prejudices, and experience of work in Indian cities are essential to success.

A SWEEPSTAKE FOR CANCER RESEARCH.

IN order to assist in the creation of a fund sufficiently large to enable the Hume-street Cancer Hospital, Dublin, to erect a research department, a sweepstake is being organised by Mr. P. L. Smyth at the hospital on the Lincoln Handicap, to be run on March 21st. Single tickets are priced 10s.; book of 12 £5. It is stated that each application will have an equal chance to win the prizes offered and at the same time help to investigate the cause and cure of this most terrible disease. The draw will take place at Hume-street Hospital on March 19th, at 3 P.M., under the supervision of the Hospital Committee and representatives of the press. A sum of £10,000 is to be divided in prizes, £5000 for the first horse. The Irish Government, in giving notice that sweepstakes are illegal and will no longer be tolerated by the police, has made exception in three cases, of which this is one.

Our Dublin correspondent writes: A month or two ago a sweepstake on a large scale was held in aid of one of the hospitals of Dublin, and several other hospitals have announced sweepstakes to be held in their support. It appears that the modus operandi is that a bookmaker or other financier gives guarantee for certain prizes and also for a considerable sum to be devoted to the funds of the particular charity concerned. He then promotes the sweepstake and any profits accruing over and above the guaranteed sums, and the necessary expenses, are his own. It is clear that with a well-organised and well-advertised sweepstake the profits may become far greater than the sum guaranteed to the hospital. Such sweepstakes are, of course, in contravention to existing law, but in the case of recognised and reputable charities the Irish Government has up to the present not put the law in force. Last week, however, the Minister for Home Affairs stated to Dail Earann that with the exception of the sweepstakes for which permission had already been given, the law would in future be strictly enforced. It is understood that certain persons interested in the Dublin hospitals are endeavouring to persuade the Government to reverse their decision, but many of the best friends of the hospitals are not displeased that a system open to grave abuse is to disappear. It is hard for a hospital to justify selling the prestige of its position for ten or any number of thousand pounds in order to permit the promoters of the gamble to win as much again. It is right to say that the sweepstakes which have been held hitherto have been conducted with entire probity and every guarantee of good faith.

TRAFFIC DANGERS.

"A Rhode Hogg" sends us the following bitter epitaph from America:—

> Here lies the body of William Jay,
> Who died maintaining the right of way;
> He was right, dead right, as he walked along,
> But he's just as dead as if he'd been wrong.

Among the deaths reported during last year to the city coroner of Manchester, fatalities arising from accidents numbered 303; of these motors were responsible for 57, horses and carts for 8, tramways and railway each for 5. Falls accounted for 85 deaths. Doubtless carelessness on the part of pedestrians contributed to these accidents, but a certain minimum would seem unavoidable under present conditions. Blame is not always easy to apportion.

THE POWERS OF SHIPS' SURGEONS.

AT a recent inquest at Southampton on a steward who died in the *Majestic* from meningitis following an accidental fall down a companion-way, two other stewards stated in evidence that they thought the man should not have been allowed to go back to his quarters. He was taken to the ship's hospital just after the accident and was afterwards in the stewards' "glory-hole" for four days before being again taken to the hospital. Dr. J. C. H. Beaumont, surgeon of the *Majestic*, said that before meningitis was apparent the man insisted on going back to his quarters, where he was visited day by day. The ship's surgeon, he said, had no power to confine a member of the crew to hospital against his wishes, unless the man was insane or suffering from some disease dangerous to the community aboard, and in either of those events the surgeon had to ask the commander to give an order. "Accidental death" was the verdict.

A clinical note from Sunderland was unaccompanied by the writer's name or address.

F. C. asks for the name of a sound and simple book to give a young man about to marry who wants instruction on sex matters.

Enquirer.—We understand that the inhalation treatment of whooping-cough at the Beckton Gas Works has been discontinued, as the medical officer of the works finds that inhalation of formalin is more efficacious and can be carried out at home.

Scrape.—An order was issued on Feb. 9th, 1920, prohibiting the importation into the United Kingdom of shaving brushes manufactured in or exported from Japan. Anyone in doubt as to the cleanliness of a new brush might soak it for an hour in a warm formalin solution (two tablespoonfuls in half a pint of water), as suggested by the Ministry of Health.

Secondary Infections in Tuberculosis.—Dr. R. E. Wingfield writes to correct an error in his article under the above title in THE LANCET of Jan. 13th. The strength of formalin used for killing bacteria for the preparation of vaccines should read 0·1 per cent. instead of 1 per cent.

Messrs. Savory and Moore call our attention to the fact that in 1796, the year in which he first performed vaccination, Dr. Edward Jenner prescribed a digestive lozenge for the relief of heartburn and acidity, which is still prepared by them from the original formula.